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Oil and Gas Well Blowout Report

Events of 1988

ERCB

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Events of 1988

ENERGY RESOURCES CONSERVATION BOARD
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1 SUMMARY

This is the fifth edition of this report. It contains specific information about wells licensed and drilled, drilling and service rig inspections, and drilling occurrences. A summary for each blow/blowout that occurred in 1988 as well as a 10-year historical blowout summary is provided. The Board considers the publication of this information to be a constructive way to improve the level of understanding of many aspects of well control and drilling occurrences, and the ERCB role in this matter.

1988 Summary

In 1988, some 6566 wells were drilled by 500 active drilling rigs. Only 5 blowouts occurred while drilling the approximately 6566 wells. There were 20 blowouts among approximately 86 000 active wells. During the year the ERCB made 1969 inspections of drilling rigs, including 216 inspections of 75 critical sour wells*. Details and comments respecting these operations are provided in the respective sections of this report.

The Board has carefully reviewed the events and incidents of 1988 and concludes that actual performance in 1988 was comparable to previous years. It is apparent that there is a growing inventory of active wells, and the fact that the leading cause of blowouts is equipment failure indicates the need for regular maintenance programs for all active wells.

In 1988, the Service Rig Inspection Manual (G-37) was introduced. Previous editions of this report included only the drilling rig inspection results; however, as a result of the implementation of Guide G-37, service rig inspection results are now contained in this report.

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* For a complete definition of a critical sour well, please refer to the Appendix.

2 WELLS LICENSED AND DRILLED

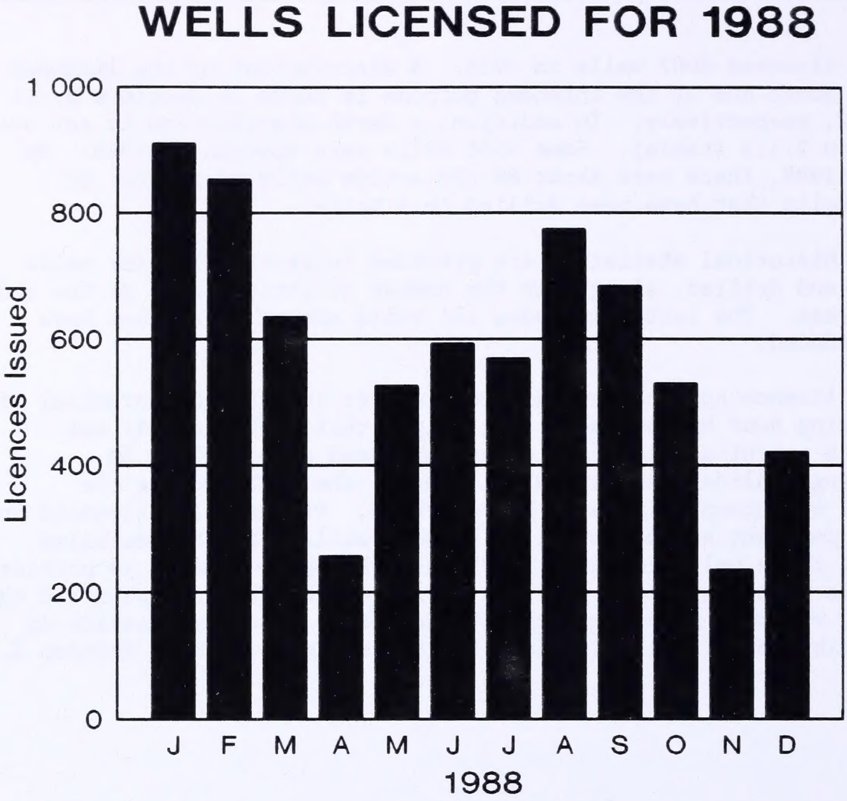
The ERCB licensed 6987 wells in 1988. A distribution of the licensed wells by month and by the intended purpose is shown in Sections 2.1.1 and 2.1.2, respectively. In addition, a depth distribution is set out in Section 2.1.3 (table). Some 6566 wells were spudded in 1988. By year-end 1988, there were about 86 000 active wells of a total of 125 000 wells that have been drilled in Alberta.

Ten-year historical statistics are provided in Section 2.2 for wells licensed and drilled, along with the number of active wells at the end of each year. The latter includes all wells except those that have been abandoned.

All well licence applications are required to address the potential of encountering sour hydrocarbons (oil or gas that contains H_2S) and assess the potential flow rate of any proposed sour wells. In considering applications for well licences, the ERCB reviews the potential of encountering sour hydrocarbons. Of the wells licensed in 1988, 35 per cent had potential to be sour wells. Further detailed review of these wells resulted in 75 wells being considered as critical sour wells that required a complete review of the drilling plan and the emergency response plan for each of those wells. Some statistics on the distribution of wells licensed in 1988 are presented in Section 2.3.

2.1 Wells Licensed - 1988

2.1.1 Wells Licensed by Month



2.1.2 Purpose of Wells Licensed

Intended Purpose	Wells
Oil and Gas Conventional	6 524
Oil Sands	343
Experimental*	25
Others#	95
Total	6 987

---

* Primarily for oil sands operations.

# Test holes, farm gas wells, industrial water wells, and domestic water wells.

2.1.3 Wells Licensed by Depth/Month

Month	Depth (m) 0-750	751-1800	1801-3600	3601-6000	6001+
Jan	456	330	118	6	0
Feb	275	428	147	3	0
Mar	241	302	86	6	0
Apr	20	187	46	4	0
May	71	373	79	4	0
June	113	385	91	4	0
July	122	351	93	3	0
Aug	203	418	149	4	0
Sept	96	482	101	4	0
Oct	145	274	109	2	0
Nov	54	124	57	1	0
Dec	165	191	62	3	0
Total	1 961	3 845	1 138	44	0

2.2 Wells Licensed and Drilled - 1988 to 1979

	Licensed*	Drilled* Conventional Oil & Gas	 Oil Sands (Estimates)	Active** Wells
1988	6 987	6 566	343	86 000
1987	5 427	4 957	148	82 000
1986	4 620	4 245	200	79 000
1985	8 763	6 600	1 800	76 000
1984	7 178	5 660	950	70 000
1983	4 935	4 367	280	66 000
1982	5 807	5 122	310	62 000
1981	6 265	5 834	260	59 000
1980	7 820	7 048	340	53 000
1979	6 391	5 780	N/A#	47 000

---

* The difference between wells licensed and wells drilled can be attributed to well licence cancellations plus those carried forward from year to year (up to 5 per cent in some years). **Also note that the addition of drilled wells to the active wells will not equate because of abandoned wells. This number includes approximately 25,000 suspended wells for the 1988 totals.

# Reliable estimates not available.

2.3 Sour Well Licensing Activity - 1988

Sweet Wells	4 567
Sour Wells	2 420
Total Wells Licensed	6 987
Critical Sour Wells	75

3 DRILLING AND SERVICE RIG INSPECTIONS

This section provides statistics on the ERCB's drilling and service rig inspection activities for the years 1983 to 1988. Rig inspections are a primary function of the area offices. The intent of an inspection is to ensure that the rig is suitably equipped and personnel properly trained and certified to maintain control of the well regardless of the operation in progress.

The ERCB does not provide staff for inspection of every well that is drilled or serviced. A selection criteria is used where emphasis is placed on rigs with poor performance histories, rigs drilling or servicing sour wells, start of winter operations, and environmentally sensitive locations. Therefore, the results cannot be interpreted as representative of overall rig quality in the province. However, the results do indicate there has been a significant improvement in rig quality over the last several years with the exception of 1988 which did not show further improvement. Drilling operations on many oil sands wells are not included in these statistics.

Since 1985, unsatisfactory rig inspection deficiencies have been classified as serious or significant. When a serious deficiency is identified the drilling operations are shut down until the deficiency is remedied. Definitions for "serious" and "significant" are detailed in the Appendix.

The Oil and Gas Conservation Regulations classifies wells according to drilling depth in defining blowout prevention requirements for drilling operations:

Class	Proposed Drilling Depth
I	Shallow well in which no surface casing is set
II	Less than 750 metres
III	Greater than 750 metres and less than 1800 metres
IV	Greater than 1800 metres and less than 3600 metres
V	Greater than 3600 metres and less than 6000 metres
VI	Greater than 6000 metres

Rig inspection coverage and results are presented by these well classifications in Sections 3.1.2 and 3.1.3. Section 3.1.4 compares rig inspection results and unsatisfactory inspections since 1984. The most frequently identified serious and significant deficiencies on the inspections are identified in Sections 3.3 and 3.4. A copy of the rig inspection form used by ERCB inspectors is provided in Section 3.5.

The ERCB places a high emphasis on inspecting sour wells, particularly critical sour wells. In 1988, each critical sour well was inspected at least three times. The results of these inspections are presented in Section 3.2.

3.1 Drilling and Service Rig Inspections

3.1.1 Summary for 1988

Wells spudded* 6 566

	Drilling	Servicing
Active rigs	500	378
Inspections	1 969	701
Unsatisfactory inspections	195	49

---

* Spudded means commenced drilling.

3.1.2 Drilling Rig Inspection Coverage and Results by Well Class - 1988

Well Class	Wells Spudded	Inspections	Total Unsatisfactory Inspections#	Serious Unsatisfactory Inspections#
I	860	46	4	1
II	963	142	19	15
III	3 590	1 000	118	71
IV	1 110	654	53	21
V	43	127	1	1
VI	0	0	0	0
Total	6 566	1 969	195	109

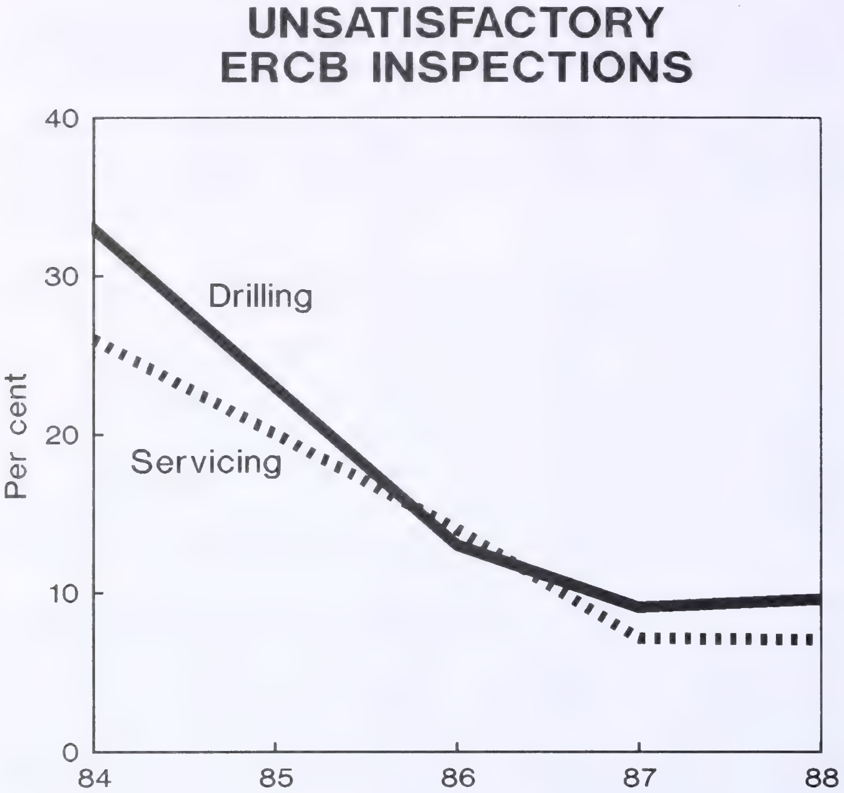
# The most frequent deficiencies are itemized in Sections 3.3 and 3.4.

3.1.3 Drilling Rig Inspection Coverage and Results by Well Class - 1987 to 1983

Year	Well Class	Wells Spudded	Inspections	Unsatisfactory Inspections
1987	I	545	33	4
	II	624	108	8
	III	2 886	965	96
	IV	909	659	61
	V	34	112	1
	VI	0	0	0
		4 998	1 877	170
1986	I	210	18	3
	II	948	174	35
	III	2 485	987	140
	IV	1 005	694	80
	V	41	108	0
	VI	0	0	0
		4 689	1 981	258
1985	I	798	32	13
	II	2 402	323	97
	III	3 360	1 144	281
	IV	1 425	879	163
	V	28	69	4
	VI	-	-	-
		8 013	2 447	558
1984	I	323	40	22
	II	1 698	190	73
	III	2 846	914	311
	IV	1 222	822	268
	V	16	49	4
	VI	-	-	-
		6 105	2 015	678
1983	I	83	16	7
	II	1 367	206	82
	III	2 178	744	259
	IV	961	649	220
	V	22	40	1
	VI	-	-	-
		4 611	1 655	569

NOTE: Some minor changes to the statistics of previous years reflect updating to the ERCB database.

3.1.4 Unsatisfactory ERCB Rig Inspections - 1984 to 1988



The percentage of unsatisfactory ERCB inspections has declined steadily over the past few years; however, further improvement did not occur in 1988.

3.2 Critical Sour Well Drilling Rig Inspections

3.2.1 Inspection Coverage and Results - 1988 to 1984

Year	Wells Licensed	Wells Spudded	Wells Drilling at Year-end	Inspections	Unsatisfactory Inspections
1988	75	75	12	216	4 (2 serious)
1987	47	45	2	161	2 (2 serious)
1986	42	34	12	130	2 (1 serious)
1985	31	29	7	88	2 (0 serious)
1984	14	13	3	45	5 (4 serious)

As is apparent from the above table, the unsatifactory inspection percentage was less than 2 per cent during 1988, indicating a very high degree of rig quality. It is also much lower than the overall 10 per cent unsatisfactory figure for other non-critical drilling inspections.

3.3 Drilling Rig Inspection Deficiency Items - 1988 Inspections

3.3.1 Most Frequent Serious Deficiency Items

Item		Percentage of Total Serious Items	Number of Occurrences
1	BOPs or hydraulic valve failed to operate from remote position	8.2	11
2	Trip records not completed or being completed incorrectly	9.7	13
3	Accumulator precharge, or operating pressure, too low to operate annular preventer and hydraulic valve	9.0	12
4	BOPs or hydraulic valve failed to operate from driller's position	6.0	8
5	Fluid by-passing through BOP controls	4.5	6
6	Mud-tank level monitoring device not operating during drilling or tripping	6.0	8
7	Accumulator pump failed to recharge accumulator	4.5	6
8	Well control data not provided (eg. maximum back pressure to be held on casing)	7.5	10
9	Casing bowl improper pressure rating	4.5	6
10	Pressure gauge in manifold inaccurate (gauge or incremental range too low)	5.2	7
11	Flare line not connected to manifold, secured, or staked down	4.5	6

Total number of occurrences was 134.

NOTE: ERCB Guide IG-11 - Rig Inspection Manual provides a complete list of serious deficiencies.

3.3.2 Most Frequent Significant Deficiency Items

Category	Description	Percentage of Total Significant Items	Number of Occurrences
1	Diesel engine shut-offs failed to stop engines	25.0	41
2	Protective coating damaged on kill/ bleed-off line shock hose	3.1	5
3	Accumulator pump failed to recharge system in 5 minutes	6.0	10
4	H_2S warning sign not posted	3.1	5
5	Flare line did not terminate in the flare pit	6.0	10
6	Incomplete pressure test data recorded in the tour reports	2.5	4
7	Crew BOP drills not recorded in tour reports	4.0	6
8	Valve handles missing on kill or bleed-off lines or manifold	2.5	4
9	Air supply not connected to diesel engine shut-offs	3.1	5
10	Valve handles missing from casing bowl outlet(s)	3.1	5
11	BOP handles not provided	2.5	4
12	Weekly diesel engine shut-off test(s) not recorded	2.5	4
13	Degasser discharge line does not terminate in flare pit	4.0	6
	Total number of occurrences was 164		

NOTE: ERCB Guide IG-11 - Rig Inspection Manual provides a complete list of significant deficiencies.

3.4 Service Rig Inspection Deficiency Items - 1988 Inspections

3.4.1 Most Frequent Serious Deficiency Items

Item		Percentage of Total Serious Items	Number of Occurrences
1	Diesel engine shut-offs did not operate	9	24.3
2	Fittings not available to obtain accumulator precharge	6	16.2
3	3-year shop servicing of BOPs not conducted	2	5.4
4	Kill or bleed-off line(s) not connected to tank or manifold	2	5.4
5	Hydraulic hoses inadequately fire-sheathed or damaged	2	5.4
6	Warning sign(s) not posted in H_2S area	2	5.4
7	Incomplete pressure test data in tour reports	2	5.4
8	Daily mechanical tests not recorded	2	5.4
9	Weekly diesel engine shut-off tests not recorded	2	5.4
10	Crude oil storage tank located within 50 metres of wellbore	2	5.4
11	Accumulator pump failed to recharge accumulator in 5 minutes	1	2.7
12	Remote BOP controls within 7 metres of wellbore	1	2.7
13	Fluid by-passing through BOP controls (BOPs still function)	1	2.7
14	Crew BOP drills not recorded in tours	1	2.7
15	Rig pump and/or tank not on location	1	2.7
16	Pressure test not recorded in tour reports	1	2.7

Total number of occurrences was 37

NOTE: ERCB Guide G-37 - Service Rig Inspection Manual provides a complete list of serious deficiencies.

3.4.2 Most Frequent Significant Deficiency Items

Category Description		Percentage of Total Significant Items	Number of occurrences
1	BOP components not pressure tested	8	21.6
2	Accumulator precharge/operating pressure too low	7	18.9
3	N_2 bottle volume low	4	10.8
4	Using inadequate preventer	2	5.4
5	Kill line and/or bleed-off line not properly secured	2	5.4
6	Accumulator pump failed to recharge accumulator	2	5.4
7	BOP control functions not clearly marked	2	5.4
8	Accumulator failed to retain 8400 kPa final operating pressure	2	5.4
9	BOPs failed to operate from remote position	2	5.4
10	BOPs failed to operate from driller's position	2	5.4
11	Improper pipe ram sizing	1	2.7
12	BOPs inadequately heated	1	2.7
13	Gauge/fittings not available for taking pressure of N_2 bottles	1	2.7
14	Driller has never held valid P.I.T.S. well servicing certificates	1	2.7

Total number of occurrences was 37

NOTE: ERCB Guide G-37 - Service Rig Inspection Manual provides a complete list of significant deficiencies.

3.5 RIG INSPECTION FORM

ERCB Energy Resources Conservation Board
640 Fifth Avenue SW
Calgary, Alta. T2P 3G4

DRILLING & SERVICING OPERATIONS INSPECTION REPORT

FIELD OPERATIONS DEPARTMENT

GENERAL INFORMATION

CONTRACTOR NAME	NUMBER	RIG NO	RIG TYPE	WELL I.D.	LE	LSD	SEC	TWP	RGE	M E
				1						W O

OPERATOR NAME	NUMBER	INSPECTION TYPE (CIRCLE) PARTIAL	COMPLETE	AREA OFFICE	INSPECTION DATE YR	MO	DAY	WELL CLASS
		P	C					

			CASING SETTING DEPTH (m)			
RIG MANAGER	CURRENT DEPTH (m)	PROJECT T.D. (m)	SURFACE	INTERMEDIATE	PRODUCTION	RIG STATUS

MECHANICAL TESTS DESCRIBE ALL TESTS CONDUCTED INCLUDING LOCATION OF EQUIPMENT AND CONTROLS

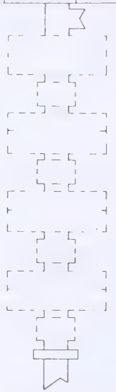
ACCUMULATOR
MAKE ______ N° BOTTLES ___
CAPACITY ______ ℓ
DESIGN PRESSURE ______ kPa
PRECHARGE PRESSURE ______ kPa
PRESSURE BEFORE ______ kPa
PRESSURE AFTER ______ kPa

RECHARGE PUMP
TIME ______ min

N_2 BOTTLES
NUMBER ______
CAPACITY ______ ℓ
AVERAGE PRESSURE ______ kPa

BOP CONTROLS	BOP	TIME TO OPERATE	PRESSURE TEST (kPa) LOW	TIME	HIGH	TIME
NO. ON FLOOR ___						
TYPE ___	ANNULAR HCR	s				min
NO. REMOTE ___	___ RAM	s		min		min
TYPE ___	___ RAM	s		min		min
DISTANCE ___ m	___ RAM	s		min		min
HAND WHEELS ___		s		min		min
	MANIFOLD					min

INSPECTION RESULTS (CODE: significant - 1 serious * - 2 both * - 3 satisfactory - x)



YES NO
☐☐ 50. RIG APPEARS SATISFACTORY?

BOP SYSTEM
☐☐ 52 BOP TYPE, RAM SIZE & PRESSURE RATING SATISFACTORY? *
☐☐ 53 BLEED OFF & KILL LINES APPEAR SATISFACTORY? *
☐☐ 54 NON-STEEL HYDRAULIC LINES FIRE SHEATHED?
☐☐ 55 DRILL STRING VALVES READILY ACCESSIBLE? *
☐☐ 56 EQUIPMENT ADEQUATELY HEATED? *
☐☐ 57 BOP EQUIPMENT & CONTROLS WORKABLE & PROPERLY CONNECTED? *
☐☐ 59 DRILL STRING PRESSURE AVAIL. AT CHOKE CONTROL? *
☐☐ 60 MUD-GAS SEPARATOR ADEQUATELY CONNECTED?
☐☐ 61 REQ'D CASING WEAR TESTS BEING PERFORMED?

TRAINING & PROCEDURES
☐☐ 70 DRILLER HAS P.I.T.S. FIRST LINE CERTIFICATE? *
☐☐ 71 CREW BOP TRAINING APPEARS SATISFACTORY? *
☐☐ 72 MUD VOL. MEAS. & HOLE FILL PROCEDURES SATISFACTORY? *
☐☐ 73 PERSON READILY AVAILABLE WITH P.I.T.S. SECOND LINE CERTIFICATE? *
☐☐ 74 DRILLER HAS P.I.T.S. WELL SERVICING CERTIFICATE? *

RIG OTHER
☐☐ 80 WELL TO FLAME TYPE EQUIPMENT 25m?
☐☐ 81 SMOKING RULES BEING OBSERVED 25m?
☐☐ 82 D.S.T. EQUIPMENT SATISFACTORY?
☐☐ 83 WARNING SIGNS POSTED IN H_2S AREAS?
☐☐ 84 BOP PRESSURE TESTS RECORDED & TEST PROCEDURES SATISFACTORY?
☐☐ 85 DAILY MECHANICAL TESTS RECORDED?
☐☐ 86 WEEKLY DIESEL ENGINE TESTS RECORDED?

ENGINES
☐☐ 90 DIESEL ENGINE SHUT-OFFS STOP ALL ENGINES?
☐☐ 91 ENGINE EXHAUSTS SATISFACTORY?

YES NO
☐☐ 100. NON-RIG RELATED ITEMS APPEAR SATISFACTORY?

MISCELLANEOUS
☐☐ 101 WELL TO: END OF FLARE LINE 50m?
☐☐ 102 RUBBISH BURN PILE 50m?
☐☐ 103 CRUDE OIL STORAGE TANK 50m?
☐☐ 104 CONDENSATE RULES BEING OBSERVED?
☐☐ 105 FLUIDS PROPERLY CONTAINED?
☐☐ 106 LICENCE POSTED? NUMBER ______
☐☐ 107 REQUIRED DEVIATION SURVEYS RUN?
☐☐ 108 CONTRACTOR & OPERATOR INSPECTIONS RECORDED?

☐☐ 114 **SPECIAL WELL?**

☐☐ **LETTER SENT BY AREA OFFICE?**

REMEDIAL ACTION REQUIRED ______

AREA OFFICE	BOARD REPRESENTATIVE	CONTRACTOR REPRESENTATIVE	OPERATOR REPRESENTATIVE	RIG DOWN TIME :

F-9 87 12

4 DRILLING, SERVICING, AND OTHER OCCURRENCES

Drilling occurrences are abnormal or non-routine conditions or events that may be encountered while drilling or operating a well. They may be contributing factors affecting efficient operations or in controlling a well if hydrocarbons are present. When encountered, and depending on severity, conditions such as lost circulation and kicks may require special consideration to prevent occurrences such as blows or blowouts. Water flows encountered while drilling, usually at shallower depths, must be stopped before drilling deeper to avoid problems in maintaining hole integrity.

A historical summary of drilling occurrences encountered while drilling wells in 1988 for various depth categories are presented in Section 4.1.1. Section 4.1.2 presents an analysis of drilling occurrences by depth for all wells drilled in the period 1979 to 1988 inclusive. The analysis covers the drilling operations of only some 63 000 wells and it should be recognized that more than one occurrence took place in some wells.

Sections 4.2, 4.3, and 4.4 address blow and blowout occurrences for well servicing and other operations as well as drilling. The numbers of blow and blowout occurrences, along with the operation being conducted at the time of the occurrence, are summarized in Section 4.2.1 for 1988. A summary of the causes of blows and blowouts by operation is presented in Section 4.2.2. A 10-year historical summary of blow and blowout occurrences by operation is provided in Section 4.2.3. Section 4.2.4 presents a 10-year summary of blowout occurrences for any sour fluids released.

A summary of each of the 5 blow and 20 blowout occurrences in 1988 is presented in Section 4.3. Specific information to identify the well and the operations being conducted at the time of the occurrence, along with a brief description of the event, control procedures, cause, losses, injuries, and actions to prevent future occurrences, is provided. In some cases the exact cause and events leading to the occurrence are not fully known and have been postulated.

An abbreviated 10-year historical summary of blow and blowout occurrences is presented in Section 4.4.

The Appendix provides the definitions of terms used in the drilling occurrence summaries in this report.

4.1 Drilling Occurrences - Drilling Operations Only

4.1.1 Historical Drilling Occurrences (including water flows) 1988 to 1980

KICKS

Depth (metres)	1988	1987	1986	1985	1984	1983	1982	1981	1980
0 - 750	80	63	63	98	69	58	67	113	117
751 - 1 800	104	128	97	154	116	94	58	89	118
1 801 - 3 600	89	51	66	94	92	69	44	72	88
3 601 - 6 000	9	12	4	8	4	2	3	15	23
6 001+	0	0	0	0	0	0	0	0	0
Total	282	254	230	354	281	223	172	289	346

BLOWS

Depth (metres)	1988	1987	1986	1985	1984	1983	1982	1981	1980
0 - 750	0	1	0	0	0	1	1	4	2
751 - 1 800	1	0	2	2	0	2	3	3	4
1 801 - 3 600	0	0	0	0	0	1	2	3	2
3 601 - 6 000	0	0	0	0	0	0	1	1	0
Total	1	1	2	2	0	4	7	11	8

BLOWOUTS

Depth (metres)	1988	1987	1986	1985	1984	1983	1982	1981	1980
0 - 750	1	2	2	1	0	0	2	1	2
751 - 1 800	3	0	0	0	2	1	0	1	0
1 801 - 3 600	1	0	0	0	2	0	2	0	0
3 601 - 6 000	0	0	0	0	0	0	0	0	0
6 001+	0	0	0	0	0	0	0	0	0
Total	5	2	2	1	4	1	4	2	2

LOST CIRCULATION

Depth (metres)	1988	1987	1986	1985	1984	1983	1982	1981	1980
0 - 750	933	853	856	1316	950	681	894	1060	1258
751 - 1 800	441	477	406	484	407	341	266	355	335
1 801 - 3 600	142	141	132	159	124	95	84	163	212
3 601 - 6 000	15	9	7	7	0	2	3	6	9
6 001+	0	0	0	0	0	0	0	0	0
Total	1531	1480	1401	1966	1481	1119	1247	1584	1814

WATER FLOWS

Depth (metres)	1988	1987	1986	1985	1984	1983	1982	1981	1980
0 - 100	8	9	12	8	11	5	7	10	33
101 - 200	7	5	8	1	7	3	5	9	7
201 - 300	7	0	5	8	1	2	1	3	6
301 - 400	2	3	2	2	0	2	1	2	2
401 - 750	1	0	0	6	3	2	5	4	10
751 - 1 800	2	3	1	6	1	14	5	4	11
1 801 - 3 600	1	1	0	4	0	13	1	0	12
3 601 - 6 000	0	0	0	0	0	0	0	0	0
Total	28	21	28	35	23	41	25	32	81

4.1.2 Drilling Occurrence Analysis - Drilling Operations 1979 to 1988

Occurrence Type								Occurrences Per 1000 Wells Drilled				
Depth of Occurrence	Cum Wells	Kicks	Blows	Blow-outs	Lost Circ	Water Flows	Total Occurr	Kicks	Blows	Blow-outs	Lost Circ	Water Flows
0- 500	62 629	387	8	6	7 880	211	8 492	6.18	0.13	0.10	125.82	3.36
501-1000	54 208	730	13	4	2 395	48	3 190	13.48	0.24	0.07	44.18	0.89
1001-1500	30 389	317	8	1	1 507	14	1 847	10.43	0.26	0.03	42.78	0.49
1501-2000	18 210	392	7	3	1 300	15	1 717	21.52	0.38	0.16	71.39	0.82
2001-2500	8 167	212	2	2	447	14	677	25.96	0.24	0.24	54.73	1.71
2501-3000	3 508	212	2	2	285	7	513	60.43	2.00	0.57	81.24	2.00
3001-3500	1 320	112	1	1	173	2	289	84.85	0.76	0.76	131.06	1.51
3501-4000	569	46	0	0	48	0	94	80.84	0.00	0.00	84.36	0.00
4001-4500	262	36	1	0	18	0	55	137.40	3.82	0.00	68.70	0.00
4501-5000	135	19	0	0	12	0	31	140.74	0.00	0.00	88.89	0.00
5000 +	41	9	1	0	0	0	10	219.51	24.39	0.00	0.00	0.00
Total	62 629	2 472	48	19	14 065	311	16 915	39.47	0.77	0.30	224.58	4.97

4.2 Blow and Blowout Occurrences - Drilling, Servicing, and Other Operations

4.2.1 Blow and Blowout Occurrences - 1988 - All Operations

Operation	Blows	Blowouts
Drilling	1	5
Servicing	2	6
Other	2	9
Total	5	20

4.2.2 Causes of Blows/Blowouts - 1988

Occurrence	Operation and Cause
Blows - 5	Drilling - 1 Swabbing - 1
	Servicing - 2 Equipment failure - 2
	Other - 2 Equipment failure - 2
Blowouts - 20	Drilling - 5 Human error - 4 Shallow gas - 1
	Servicing - 6 Equipment failure - 4 Human error - 1 Unknown - 1
	Other - 9 Equipment failure - 3 Third-party damage - 3 Inadequate cementing - 1 Overpressured formation - 1 Human error - 1
Total - 25	

4.2.3 Blow and Blowout Occurrences (Historical Statistics) 1988 to 1979

	Blows		Blowouts			Total Blow/ Blowouts
	Drilling	Servicing & Other	Drilling	Servicing	Other	
1988	1	4	5	6	9	25
1987	1	5	2	2	13	23
1986	2	6	2	4	12	26
1985	2	5	1	6	15	29
1984	0	3*	4	4	7	18
1983	4	4	1	3	9	21
1982	6	8	4	4	8	30
1981	11	3	2	3	8	27
1980	9	6	2	5	3	25
1979	9	2	2	5	5	23
Total	45	46	25	42	89	247

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* Prior to 1984 many servicing and other blows were not recorded.

4.2.4 Blowout Occurrences with Sour Fluids Released (Historical Statistics) 1988 to 1979

	Drilling			Servicing			Other		
	Sweet	Sour	Total	Sweet	Sour	Total	Sweet	Sour	Total
1988	4	1	5	6	0	6	8	1	9
1987	2	0	2	2	0	2	11	2	13
1986	2	0	2	3	1	4	11	1	12
1985	1	0	1	5	1	6	11	4	15
1984	4	0	4	4	0	4	5	2	7
1983	0	1	1	2	1	3	8	1	9
1982	3	1	4	1	3	4	7	1	8
1981	1	1	2	2	1	3	7	1	8
1980	2	0	2	5	0	5	2	1	3
1979	2	0	2	5	0	5	3	2	5
Total	21	4	25	35	7	42	73	16	89

4.3 Blow/Blowout Summaries of Each Occurrence - 1988

A summary of each of the 25 blow/blowout occurrences for 1988 is presented in the following tabulations. The definitions regarding the type of occurrences and the operations at the time of the occurrences are provided in the Appendix.

BLOW/BLOWOUT SUMMARY

WELL NAME: ANDERSON ET AL CULP 16-2-79-24

LOCATION 100/16-02-079-24 W5/0 LICENCE NO.: 0135912

OCCURRENCE

___ BLOW; X BLOWOUT DATE: 13 SEPTEMBER/88 DURATION: 20 DAYS

OPERATION AT THE TIME OF OCCURRENCE

X DRILLING; ___ SERVICING; ___ OTHER

TRIPPING FOR BIT

LICENSEE: ANDERSON EXPLORATION LTD.

CONTRACTOR: BEAVER DRILLING

FORMATION: DEBOLT AND/OR WABAMUN DEPTH: 1925 m

FORMATION PRESSURE: 19 900 kPa or DRILLING FLUID DENSITY: 1140 kg/m^3

STATUS OF WELL AT TIME OF OCCURRENCE: DRILLING

DESCRIPTION OF EVENT: A gas kick was experienced while tripping in the hole. The well was shut in and an attempt was made to circulate out the kick, however, the volume of gas was too great, causing an underground blowout.

CONTROL PROCEDURES: Continued circulation and production from relief well was required to regain control.

CAUSE OF BLOW/BLOWOUT: Human error - swabbing.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Improving tripping procedures.

HYDROCARBON AND/OR EQUIPMENT LOSS: Approximately 1000 x 10^3 m^3 of gas (2% H_2S), chokes, rig manifold, valves on flare line and separator.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: BANKENO NCO NEERLANDIA 9-26-61-5

LOCATION 100/09-26-061-05 W5/0 LICENCE NO.: 0130601

OCCURRENCE

____ BLOW; X BLOWOUT DATE: 2 FEBRUARY 88 DURATION: 4 DAYS

OPERATION AT THE TIME OF OCCURRENCE

____ DRILLING; ____ SERVICING; X OTHER

LICENSEE: BANKENO RESOURCES LTD.

CONTRACTOR:

FORMATION: U. BELLY RIVER DEPTH: 245 - 275 m

FORMATION PRESSURE: 3575 kPa or DRILLING FLUID DENSITY: ____ kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: STANDING

DESCRIPTION OF EVENT: Bankeno received a call from the landowner that water was flowing from the well and had formed an ice cap over the well. The landowner estimated the flow to have started on 2 Feb 1988. The water flow was escaping through the casing slips from the production-surface casing annulus.

CONTROL PROCEDURES: 5 Feb 1988 a crew was dispatched to the site to install a wellhead. A backhoe was used to clear ice away from the well and to dig a small pit to collect any water for disposal off lease. Gravel, teflon, rubber and bentonite were injected under the slips to plug off the water flow.

CAUSE OF BLOW/BLOWOUT: Inadequate cementing - Low cement top allowed shallow formation to flow.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Ensure primary cementing operations cover all hydrocarbon-bearing formations in well and install adequate wellhead or blanking flange upon completion of cementing operations.

HYDROCARBON AND/OR EQUIPMENT LOSS: Small volume of sweet gas and 475 m³ water.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: CS ET AL CARROT 11-22-52-12

LOCATION 100/11-22-052-12 W5/0 LICENCE NO.: 0088976

OCCURRENCE

____ BLOW; X BLOWOUT DATE: 15 JANUARY 1988 DURATION: 12 HOURS

OPERATION AT THE TIME OF OCCURRENCE

____ DRILLING; X SERVICING; ____ OTHER

LICENSEE: CANADIAN OCCIDENTAL PETROLEUM LTD.

CONTRACTOR: BAKER WIRELINE SERVICES

FORMATION: JURASSIC "X" DEPTH: 2236 m

FORMATION PRESSURE: 14 450 kPa or DRILLING FLUID DENSITY: ____ kg/m^3

STATUS OF WELL AT TIME OF OCCURRENCE: SUSPENDED GAS WELL

DESCRIPTION OF EVENT: During a work-over to open a sliding sleeve, a wireline unit was pulling out of the hole. The tools encountered an obstruction and the wireline parted. The tool and 12 m of slick line were forced up into the wireline lubricator where they became jammed. Neither the wellhead valve nor the wireline BOPs would close, due to the tool being jammed across it. The lubricator pack-off was closed as much as possible but gas continued to leak at a very small rate.

CONTROL PROCEDURES: A pressure truck pumped 35 m^3 of KCl water down the tubing to kill the well. Tools and wireline were removed and the master valve closed.

CAUSE OF BLOW/BLOWOUT: Equipment failure. Wireline broke. Master valve on wellhead and wireline BOPs would not close due to the tool being jammed across them.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Care and precaution should be taken when pulling tools out of the hole.

HYDROCARBON AND/OR EQUIPMENT LOSS: Approx. 1.5×10^3 m^3 of sweet gas.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: CDN-SUP LIEGE 6-13-92-21

LOCATION 100/06-13-092-21 W4/00 LICENCE NO.: 0099946

OCCURRENCE

____ BLOW; X BLOWOUT DATE: 4 FEBRUARY 1988 DURATION: 1.5 DAYS

OPERATION AT THE TIME OF OCCURRENCE

____ DRILLING; ____ SERVICING; X OTHER

LICENSEE: CANADIAN SUPERIOR OIL LTD.

CONTRACTOR: HAUB'S OILFIELD CONSTRUCTION

FORMATION: L. MANN - DEVONIAN MU #1 DEPTH: 251.4 - 258.0 m

FORMATION PRESSURE: 800 kPa or DRILLING FLUID DENSITY: ____ kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: SHUT-IN GAS WELL

DESCRIPTION OF EVENT: While working on the lease, the grader operator struck the well, breaking off a nipple from the wellhead allowing the well to flow uncontrolled.

CONTROL PROCEDURES: High-pressure pumping units were tied into the tubing. 4.5 m³ of water was pumped down the tubing, killing the well.

CAUSE OF BLOW/BLOWOUT: Third-party damage - Grader operator struck wellhead at night.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Ensure wellheads are clearly visible, adequate precautions are taken to minimize traffic near the wellhead or install adequate fencing or barriers around well.

HYDROCARBON AND/OR EQUIPMENT LOSS: 430 x 10^3 m³ sweet gas.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: CDCOG ET AL POLLOCKVILLE 2-31-25-10

LOCATION 100/02-31-025-10 W4/0 LICENCE NO.: 0099333

OCCURRENCE

____ BLOW; X BLOWOUT DATE: 30 OCTOBER 1988 DURATION: 3 DAYS

OPERATION AT THE TIME OF OCCURRENCE

____ DRILLING; X SERVICING; ____ OTHER

LICENSEE: CANTERRA ENERGY LTD.

CONTRACTOR: CANADIAN HYDRAULIC WORKOVERS

FORMATION: BASAL QUARTZ DEPTH: 988.0 - 989.0 m

FORMATION PRESSURE: 9637 kPa or DRILLING FLUID DENSITY: ____ kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: FLOWING GAS WELL

DESCRIPTION OF EVENT: After snubbing production tubing with tubing plug back into the well and snubbing stack removed, the wellhead was installed. Methonol was pumped into the tubing prior to recovery of the tubing plug which resulted in a fishing operation with braided line to recover the parted wireline and plug. An explosion occurred upon initial flow-back to the rig tank resulting in a failure of the adapter flange below the master valve and fire.

CONTROL PROCEDURES: The fire was extinguished and a BOP stack lowered onto the well. The flow was diverted to flare pits. The blind rams and the flare line valves were closed shutting off the flow.

CAUSE OF BLOW/BLOWOUT: Equipment failure - Internal wellhead explosion.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Cause of ignition has not been determined.

HYDROCARBON AND/OR EQUIPMENT LOSS: 850 x 10^3 m^3 sweet gas.

INJURIES: 1 injury.

BLOW/BLOWOUT SUMMARY

WELL NAME: C. NOREX ET AL NIPISI 8-5-79-8

LOCATION 100/08-05-079-08 W5/0 LICENCE NO.: 0119518

OCCURRENCE

____ BLOW; X BLOWOUT DATE: 16 JANUARY 1988 DURATION: 3.5 HOURS

OPERATION AT THE TIME OF OCCURRENCE

_____ DRILLING; _____ SERVICING; X OTHER

LICENSEE: CONSOLIDATED NOREX RESOURCES CORP.

CONTRACTOR: EMERALD TRUCKING

FORMATION: GILWOOD "A" DEPTH: 1722 m

FORMATION PRESSURE: 18 240 kPa or DRILLING FLUID DENSITY: ________ kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: FLOWING OIL WELL

DESCRIPTION OF EVENT: Tank truck backed into wellhead, damaging the tubing bonnet. This allowed the well to flow uncontrolled.

CONTROL PROCEDURES: A high-pressure pumping unit was tied into the tubing-casing annulus. 16 m³ of salt water was pumped down the annulus killing the well. A new tubing bonnet and master valve was installed.

CAUSE OF BLOW/BLOWOUT: Third party damage - truck backed into wellhead.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Ensure wellheads are clearly visible. Adequate precautions are taken to minimize traffic near wellhead or adequately protect wellheads with barricade or fencing.

HYDROCARBON AND/OR EQUIPMENT LOSS: 35 m³ sweet oil (25 m³ oil salvaged)

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: DEKALB BASHAW 7-31-42-22

LOCATION 100/07-31-042-22 W4/0 LICENCE NO.: 0106130

OCCURRENCE

____ BLOW; X BLOWOUT DATE: 16 JULY 1988 DURATION: 1 DAY

OPERATION AT THE TIME OF OCCURRENCE

_____ DRILLING; _____ SERVICING; X OTHER

LICENSEE: DEKALB PETROLEUM CORPORATION

CONTRACTOR:

FORMATION: BELLY RIVER DEPTH: 460.5 - 470.5 m

FORMATION PRESSURE: 1772 kPa or DRILLING FLUID DENSITY: ____ kg/m^3

STATUS OF WELL AT TIME OF OCCURRENCE: CAPPED GAS WELL

DESCRIPTION OF EVENT: A farmer struck the wellhead with a tractor and bailer. The casing was bent and the master valve broken off. This allowed the well to flow uncontrolled.

CONTROL PROCEDURES: Hoses were run into the casing and 13 m^3 of KCl water was pumped down the casing killing the well.

CAUSE OF BLOW/BLOWOUT: Third-party damage.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Install adequate barriers or fencing around wellhead.

HYDROCARBON AND/OR EQUIPMENT LOSS: 2.9 x 10^3 m^3 sweet gas, wellhead.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: DOME ET AL STRACHAN 6-26-37-9

LOCATION 100/06-26-037-09 W5/0 LICENCE NO.: 104483

OCCURRENCE

____ BLOW; X BLOWOUT DATE: 6 JULY 1988 DURATION: 1.3 HOURS

OPERATION AT THE TIME OF OCCURRENCE

_____ DRILLING; _____ SERVICING; X OTHER

LICENSEE: DOME PETROLEUM LTD.

CONTRACTOR:

FORMATION: GLAUCONITIC DEPTH: 3072 - 3080 m

FORMATION PRESSURE: 12 500 kPa or DRILLING FLUID DENSITY: ________ kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: GAS WELL

DESCRIPTION OF EVENT: Temporary piping had been installed on the wellhead and was subjected to a short duration "leak test". The operator opened a master valve to initiate flow to the flare pit. A section of piping, assorted well equipment and master valve failed resulting in an uncontrolled flow.

CONTROL PROCEDURES: Well loaded up with produced fluid. No action was required to control the well.

CAUSE OF BLOW/BLOWOUT: Human error (incorrect procedure) - Improper purging of piping modifications resulting in gas-air mixture in piping. Explosion attributed to possible flow-induced friction resulting in piping and wellhead failure.

ACTIONS TO PREVENT FUTURE OCCURRENCES: All pipe fabrication new and existing should be adequately purged to eliminate air, prior to use.

HYDROCARBON AND/OR EQUIPMENT LOSS: Small volume of sweet gas, wellhead.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: ESSO 85 D1-15 COLD LAKE

LOCATION 108/13-12-065-04 W4/0 LICENCE NO.: 0114414

OCCURRENCE

___ BLOW; X BLOWOUT DATE: 17 MAY 1988 DURATION: 8 HOURS

OPERATION AT THE TIME OF OCCURRENCE

___ DRILLING; ___ SERVICING; X OTHER

LICENSEE: ESSO RESOURCES CANADA LTD.

CONTRACTOR: N/A

FORMATION: McMURRAY DEPTH: 610 m

FORMATION PRESSURE: 3156 kPa or DRILLING FLUID DENSITY: ___ kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: PUMPING CRUDE BITUMEN (STEAM CYCLIC)

DESCRIPTION OF EVENT: The well was on its producing cycle; another well on the same production pad was on steam injection. Steam broke through between the two wells. The resulting steam and sand flow eroded the wellhead and flowline at the pumping well.

CONTROL PROCEDURES: A high pressure kill line from a pumper was tied in and water was pumped down the tubing.

CAUSE OF BLOW/BLOWOUT: Overpressured formation - unexpected downhole communication between the two wells (known as a push).

ACTIONS TO PREVENT FUTURE OCCURRENCES: Improve monitoring procedures on adjacent injection and producing wells.

HYDROCARBON AND/OR EQUIPMENT LOSS: Approx. 12 m³ of sweet oil.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: EXCEL ET AL SUTTON 6-35-92-3

LOCATION 100/06-35-092-03 W6/0 LICENCE NO.: 0132075

OCCURRENCE

____ BLOW; X BLOWOUT DATE: 16 FEBRUARY 1988 DURATION: 3 DAYS

OPERATION AT THE TIME OF OCCURRENCE

X DRILLING; _____ SERVICING; _____ OTHER

TRIPPING OUT OF HOLE

LICENSEE: EXCEL ENERGY INC.

CONTRACTOR: ATCO RIG #6

FORMATION: BELLOY DEPTH: 775 m

FORMATION PRESSURE: 5300 kPa or DRILLING FLUID DENSITY: 1130 kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: DRILLING

DESCRIPTION OF EVENT: The well was shut in after gas appeared at surface. The rig crew picked up and installed the kelly. Gas broached to surface outside the surface casing and was ignited by the rig motors.

CONTROL PROCEDURES: High-density drilling fluid was circulated through drill pipe after the rig debris had been removed.

CAUSE OF BLOW/BLOWOUT: Human error compounded by equipment failure - inadequate tripping procedures (hole fill and swabbing) suspected as the cause of the influx. The blowout resulted from failure of the HCV to open.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Improved tripping procedures with respect to hole fill and drill pipe withdrawal rate. Ensure all BOP equipment is functioning and crews knowledgeable of appropriate actions.

HYDROCARBON AND/OR EQUIPMENT LOSS: 125 x 10^3 m^3 sweet gas, drilling rig and related equipment.

INJURIES: 2 crew members sustained burn injuries.

BLOW/BLOWOUT SUMMARY

WELL NAME: GNE ECSTASY PREVO 8-4-39-1

LOCATION 100/08-04-039-01W5/0 LICENCE NO.: 0108721

OCCURRENCE

X BLOW; ____ BLOWOUT DATE: 6 JANUARY 1988 DURATION: 10 HOURS

OPERATION AT THE TIME OF OCCURRENCE

_____ DRILLING; X SERVICING; _____ OTHER

LICENSEE: GNE RESOURCES LTD.

CONTRACTOR: ROLL'N WELL SPACING

FORMATION: BASAL QUARTZ; VIKING DEPTH: 2120-2132; 1876-82m

FORMATION PRESSURE: 10 000 kPa or DRILLING FLUID DENSITY: ________ kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: PRODUCING TRIPLE ZONE (OIL AND GAS).

DESCRIPTION OF EVENT: The uncontrolled flow occurred at a flange connection between the offset ram BOP and the tubing head.

CONTROL PROCEDURES: Control was gained by bleeding off the gas pressure, tightening the flange connection, bull heading oil into the tubing and annulus and setting a tubing plug.

CAUSE OF BLOW/BLOWOUT: Equipment failure - the ring gasket between the BOP stack and tubing head failed.

ACTIONS TO PREVENT FUTURE OCCURRENCES: BOP's connection to wellhead must be completely pressure tested prior to commencement of servicing operations.

HYDROCARBON AND/OR EQUIPMENT LOSS: 14.7 m³ of oil.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: GULF ERSKINE 10-6-39-20

LOCATION 100/10-06-039-20 W4/0 LICENCE NO.: 0010867

OCCURRENCE

X BLOW; ____ BLOWOUT DATE: 14 JULY 1988 DURATION: 3.5 HOURS

OPERATION AT THE TIME OF OCCURRENCE

____ DRILLING; ____ SERVICING; X OTHER

LICENSEE: GULF CANADA RESOURCES LIMITED

CONTRACTOR:

FORMATION: LEDUC D3 A DEPTH: 1637 m

FORMATION PRESSURE: 10 000 kPa or DRILLING FLUID DENSITY: ____ kg/m^3

STATUS OF WELL AT TIME OF OCCURRENCE: PUMPING OIL WELL

DESCRIPTION OF EVENT: The polish rod separated and oil and gas were flowing from the stuffing box. Effluent flowed out the casing valve, up through flow tee, and out stuffing box.

CONTROL PROCEDURES: Closed casing valve.

CAUSE OF BLOW/BLOWOUT: Equipment failure. Polish rod failed and check valve between tubing and flowline failed resulting in an uncontrolled flow from the casing annulus through stuffing box.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Install pollution control check valve on well above flow tee and regular stuffing box.

HYDROCARBON AND/OR EQUIPMENT LOSS: 8.2 x 10^3 m^3 sour gas, 8 m^3 sour oil.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: HB UNION KAYBOB 4-3-62-20

LOCATION 100/04-03-062-20 W5/0 LICENCE NO.: 0026706

OCCURRENCE

____ BLOW; X BLOWOUT DATE: 27 APRIL 1988 DURATION: 12 HOURS

OPERATION AT THE TIME OF OCCURRENCE

____ DRILLING; X SERVICING; ____ OTHER

LICENSEE: DOME PETROLEUM LTD.

CONTRACTOR: CANADIAN FRACMASTER LTD.

FORMATION: TRIASSIC DEPTH: 2171 - 2176 m

FORMATION PRESSURE: 21 000 kPa or DRILLING FLUID DENSITY: ____ kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: SOLVENT INJECTION WELL

DESCRIPTION OF EVENT: A scale removal substance to clean out the production tubing was being circulated through coiled tubing. The chemical had been circulated to surface when events resulted in the well being shut in. Shortly after, an explosion occurred resulting in an uncontrolled flow.

CONTROL PROCEDURES: A new endless tubing unit was rigged in. New tubing was spliced into the old endless tubing in wellhead, the lines were pressure tested, and brine solution was pumped down the coiled tubing killing the well.

CAUSE OF BLOW/BLOWOUT: Chemical reaction with the scale resulted in release of oxygen; however the source of ignition is unknown.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Discontinue the use of this type of scale removal substance.

HYDROCARBON AND/OR EQUIPMENT LOSS: Endless tubing unit, BOP stack, conductor pipe, surface casing, production casing, production tubing and wellhead.

INJURIES: 1 injury.

BLOW/BLOWOUT SUMMARY

WELL NAME: INVERNESS LITTLE BOW 7-6-15-18

LOCATION 102/07-06-015-18 W4/0 LICENCE NO.: 0130739

OCCURRENCE

____ BLOW; X BLOWOUT DATE: 6 JANUARY 1988 DURATION: 1 DAY

OPERATION AT THE TIME OF OCCURRENCE

X DRILLING; _____ SERVICING; _____ OTHER

TRIPPING OUT OF HOLE

LICENSEE: INVERNESS DRILLING LTD.

CONTRACTOR: BODOR DRILLING LTD.

FORMATION: GLAUCONITIC DEPTH: 1173 m

FORMATION PRESSURE: 11 696 kPa or DRILLING FLUID DENSITY: 1130 kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: DRILLING

DESCRIPTION OF EVENT: Formation fluids entered the wellbore. The fluid was directed to the manifold; however, an ice plug had formed in the line to the degasser, flow was then directed to the flare pit.

CONTROL PROCEDURES: High-density mud was made up on lease and pumped down drill string to kill the well.

CAUSE OF BLOW/BLOWOUT: Human error - inadequate hole filling procedures and swabbing the well in.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Increase training for crews on BOP drills and tripping procedures and ensure all equipment is functioning correctly, in all weather conditions.

HYDROCARBON AND/OR EQUIPMENT LOSS: Minimal hydrocarbon losses. Equipment repairs to bleed-off system required.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: KMG ET AL FERRYBANK 6-14-44-28

LOCATION 100/06-14-044-28 W4/0 LICENCE NO.: 0099204

OCCURRENCE (DEFINITIONS ON BACK OF THIS FORM)

____ BLOW; _X_ BLOWOUT DATE: 28 NOVEMBER 1988 DURATION: 7.75 HOURS

OPERATION AT THE TIME OF OCCURRENCE

____ DRILLING; _X_ SERVICING; ____ OTHER

WIRELINE DEWAXING

LICENSEE: KERR-MCGEE CORPORATION

CONTRACTOR: CARNWOOD

FORMATION: BASAL QUARTZ DEPTH: 1679 - 1685 m

FORMATION PRESSURE: 9515 kPa or DRILLING FLUID DENSITY: ____ kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: FLOWING OIL/GAS WELL

DESCRIPTION OF EVENT: The contractor loosened a pack-off nut on the wireline lubricator. The nut and packing blew off the lubricator. An attempt was made to shut master valve, but wireline tools suspended through the valve prevented its closure.

CONTROL PROCEDURES: A hot tap was made into the lubricator and a gel compound was injected into the lubricator shutting off all flow from the well.

CAUSE OF BLOW/BLOWOUT: Human error - Improper operation of equipment.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Proper operating procedures must be observed.

HYDROCARBON AND/OR EQUIPMENT LOSS: Approximately 7 x 10^3 m^3 sweet gas, 0.1 m^3 oil.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: LOMAPETE ET AL CESSFORD 6-34-23-13

LOCATION 100/06-34-023-13 W4/00 LICENCE NO.: 0133909

OCCURRENCE

___ BLOW; X BLOWOUT DATE: 17 OCTOBER 1988 DURATION: 21 DAYS

OPERATION AT THE TIME OF OCCURRENCE

___ DRILLING; X SERVICING; ___ OTHER

LICENSEE: LOMALTA PETROLEUMS LTD.

CONTRACTOR: CANADIAN HYDRAULIC WORKOVERS

FORMATION: BASAL QUARTZ DEPTH: 996.5 m

FORMATION PRESSURE: 9813 kPa or DRILLING FLUID DENSITY: 1100 kg/m^3

STATUS OF WELL AT TIME OF OCCURRENCE: STANDING

DESCRIPTION OF EVENT: Operations were being conducted to remove a retrievable bridge plug. A coiled tubing unit had circulated out fill on top of the bridge plug and snubbing operations were being utilized to recover plug. While bleed-off operations were being initiated on the snubbing stack, an explosion occurred causing a catastrophic failure in the casing strings and resultant blowout.

CONTROL PROCEDURES: A relief well was drilled to the Basal Quartz and KC fluid was pumped into the formation killing the well.

CAUSE OF BLOW/BLOWOUT: Equipment failure - caused by downhole explosion.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Purge the well with formation gas prior to pulling tabulars to eliminate an explosive mixture.

HYDROCARBON AND/OR EQUIPMENT LOSS: 270 x 10^3 m^3 sweet gas, the well.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: NORCEN FERRIER 14-21-38-7

LOCATION 100/14-21-038-07 W5/0 LICENCE NO.: 0104205

OCCURRENCE

____ BLOW; X BLOWOUT DATE: 14 JANUARY 1988 DURATION: 3 DAYS

OPERATION AT THE TIME OF OCCURRENCE

_____ DRILLING; X SERVICING; _____ OTHER

LICENSEE: NORCEN ENERGY RESOURCES LTD.

CONTRACTOR: ALBERTA GOLD WELL SERVICING AND ALSASK SNUBBING

FORMATION: GLAUCONITE DEPTH: 2820 m

FORMATION PRESSURE: 30 500 kPa or DRILLING FLUID DENSITY: ________ kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: CAPPED GAS WELL

DESCRIPTION OF EVENT: The tubing/packer assembly was to be snubbed out of the hole. A tubing plug had been set in the tubing; however during attempts to remove the dognut and unseat the packer, the tubing hydrauliced out of the well, caught on the tongs and gas began to flow from the tubing.

CONTROL PROCEDURES: Several attempts to hot tap and inject plugging material failed. A full opening stabbing valve was installed and the well shut in.

CAUSE OF BLOW/BLOWOUT: Equipment failure - difficulty in unseating the packer resulted in a shear pin in the blanking plug shearing and allowing the equalizing prong in the plug to move. A high differential pressure existed across the plug, and gas was then able to flow through the equalizing ports and into the tubing. Attempts to initially install stabbing valve failed due to bent tubing.

ACTIONS TO PREVENT FUTURE OCCURRENCES: A stabbing valve should be installed during the early stages of tubing and packer withdrawal.

HYDROCARBON AND/OR EQUIPMENT LOSS: 60 x 10^3 m^3 sweet gas, damaged tubing joints.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: PALOMA ET AL BERRY 10-14-28-13

LOCATION 100/10-14-028-13 W4/0 LICENCE NO.: 0075851

OCCURRENCE

____ BLOW; X BLOWOUT DATE: 31 DECEMBER 1988 DURATION: 9 HOURS

OPERATION AT THE TIME OF OCCURRENCE

____ DRILLING; ____ SERVICING; X OTHER

LICENSEE: PALOMA PETROLEUM LTD.

CONTRACTOR:

FORMATION: VIKING B DEPTH: 982 - 983 m

FORMATION PRESSURE: 7803 kPa or DRILLING FLUID DENSITY: ____ kg/m^3

STATUS OF WELL AT TIME OF OCCURRENCE: FLOWING GAS WELL

DESCRIPTION OF EVENT: Operator was closing the master valve on the wellhead when the adapter flange failed at the threaded connection, resulting in an uncontrolled flow.

CONTROL PROCEDURES: A pressure truck was tied into the casing annulus, and fresh water was pumped down the annulus to kill the well.

CAUSE OF BLOW/BLOWOUT: Equipment failure - metal fatigue.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Scheduled maintenance checks.

HYDROCARBON AND/OR EQUIPMENT LOSS: 8.5×10^3 m^3 sweet gas, adapter flange.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: PAN AM A-2 CLIVE 12-2MU-40-24

LOCATION 100/12-02-040-24 W4/0 LICENCE NO.: 0029027

OCCURRENCE

X BLOW; ____ BLOWOUT DATE: 29 AUGUST 1988 DURATION: 6.5 HOURS

OPERATION AT THE TIME OF OCCURRENCE

____ DRILLING; X SERVICING; ____ OTHER

TRIPPING PUMP RODS FROM WELL

LICENSEE: GULF CANADA RESOURCES LTD.

CONTRACTOR: ALBERTA GOLD RIG #6

FORMATION: D-3 LEDUC DEPTH: 1877 m

FORMATION PRESSURE: 13 770 kPa or DRILLING FLUID DENSITY: ______ kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: PUMPING OIL WELL

DESCRIPTION OF EVENT: While tripping the polish rods out of the well, fluids from the well began to flow. The rig crew attempted to close the radigan but were unsuccessful.

CONTROL PROCEDURES: An attempt to remove the rod table to install a polish rod and stuffing box was unsuccessful. A two foot rod pup was tied onto the rod string and the string lifted with a picker. The elevator and rod table were removed (damaged rod stripper encountered). The damaged sub was removed and the the rod string dropped down the hole. The LC/master valve was closed, shutting off flow.

CAUSE OF BLOW/BLOWOUT: Equipment failure. Radigan would not properly close. Radigan sheared due to significant gas pressure and/or hydraulic surge from rig pump.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Where possible, utilize hydraulically activated polish rod BOPs. Maintain an adequate fluid column during tripping of polish rods. Regular maintenance checks and/or replacements of polish rod BOPs rubbers.

HYDROCARBON AND/OR EQUIPMENT LOSS: Approx. 15 x 10^3 m^3 H_2S gas (13%). Damaged rod string and pump.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: PEX FICKLE 10-5-51-19

LOCATION 100/10-05-51-051-19 W5/0 LICENCE NO.: 0031508

OCCURRENCE

____ BLOW; X BLOWOUT DATE: 23 DECEMBER 1988 DURATION: 5 DAYS

OPERATION AT THE TIME OF OCCURRENCE

____ DRILLING; ____ SERVICING; X OTHER

LICENSEE: PETRO-CANADA INC.

CONTRACTOR:

FORMATION: GLAUCONITE DEPTH: 3095 - 3098 m

FORMATION PRESSURE: 17 200 kPa or DRILLING FLUID DENSITY: ____ kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: SUSPENDED GAS WELL

DESCRIPTION OF EVENT: A forestry helicopter noticed oil spray around the wellhead with some accumulation on the lease. Investigation found effluent blowing from the surface casing vent.

CONTROL PROCEDURES: Since the surface casing valve had been blown off, a new valve and riser was stabbed on. Frac oil was then pumped down the hole to curtail the flow.

CAUSE OF BLOW/BLOWOUT: Equipment failure - Production casing failed due to external corrosion.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Monitor casing integrity and perform remedial work when required.

HYDROCARBON AND/OR EQUIPMENT LOSS: Approximately 105 x 10^3 m^3 of sweet gas and 13 m^3 of condensate.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: PRECAM ET AL JENNER 6-34-20-9

LOCATION 102/06-34-020-09 W4/0 LICENCE NO.: 0134590

OCCURRENCE

____ BLOW; X BLOWOUT DATE: 3 JULY 1988 DURATION: 2 DAYS

OPERATION AT THE TIME OF OCCURRENCE

X DRILLING; _____ SERVICING; _____ OTHER

TRIPPING OUT DST

LICENSEE: PRECAMBRIAN SHIELD RESOURCES LIMITED

CONTRACTOR: BLUEBIRD DRILLING CO. LTD.

FORMATION: BASAL QUARTZ DEPTH: 968.5 - 974.0 m

FORMATION PRESSURE: 10 411 kPa or DRILLING FLUID DENSITY: 1190 kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: DRILLING

DESCRIPTION OF EVENT: While tripping out DST #1 in the Basal Quartz, a flow was detected. The well was shut in and bled off through the manifold. A blowout resulted from failure of the bleed-off system.

CONTROL PROCEDURES: High-density drilling fluid was circulated through the pumpout sub killing the well.

CAUSE OF BLOW/BLOWOUT: Human error - swabbing.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Improved tripping procedures - reduce tripping rate.

HYDROCARBON AND/OR EQUIPMENT LOSS: 440 x 10^3 m^3 sweet gas, flare line, manifold valves.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: RANCHMEN'S ET AL GOODWIN 16-25-59-13

LOCATION 00/16-25-059-13 W5/0 LICENCE NO.: 0079640

OCCURRENCE

X BLOW; ____ BLOWOUT DATE: 4 FEBRUARY 1988 DURATION: 36 HOURS

OPERATION AT THE TIME OF OCCURRENCE

_____ DRILLING; _____ SERVICING; X OTHER

LICENSEE: RANCHMEN'S RESOURCES LTD.

CONTRACTOR:

FORMATION: BASAL QUARTZ DEPTH: 1652 m

FORMATION PRESSURE: __________ kPa or DRILLING FLUID DENSITY: __________ kg/m^3

STATUS OF WELL AT TIME OF OCCURRENCE: FLOWING GAS WELL

DESCRIPTION OF EVENT: The tubing bonnet connection failed while the operator was adjusting the choke.

CONTROL PROCEDURES: KCl water was pumped down the wellbore, killing the well.

CAUSE OF BLOW/BLOWOUT: Equipment failure - metallurgical defects in the bonnet. (Not suitable for low temperature service.)

ACTIONS TO PREVENT FUTURE OCCURRENCES: Ensure equipment is suitable for operating conditions.

HYDROCARBON AND/OR EQUIPMENT LOSS: Approximatley 507 x 10^3 m^3 sweet gas, 3 m^3 condensate.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: RENAISSANCE CESSFORD 3-6-23-9

LOCATION 100/03-06-023-09 W4M/0 LICENCE NO.: 0137368

OCCURRENCE

X BLOW; ____ BLOWOUT DATE: 20 NOVEMBER 1988 DURATION: 1.5 DAYS

OPERATION AT THE TIME OF OCCURRENCE

X DRILLING; ____ SERVICING; ____ OTHER

TRIPPING IN

LICENSEE: RENAISSANCE ENERGY LTD.

CONTRACTOR: PRECISION DRILLING LTD. RIG NO. 11

FORMATION: GLAUCONITIC DEPTH: 954 m

FORMATION PRESSURE: ________ kPa or DRILLING FLUID DENSITY: 1130 kg/m^3

STATUS OF WELL AT TIME OF OCCURRENCE: ________

DESCRIPTION OF EVENT: Original kick occurred while tripping for a bit at 530 m. Circulated out kick. Ran back in hole. Another kick taken at 740 m. Circulated out kick. Ran pipe to bottom. Well unloaded all fluid from hole and began to flow gas. Could not shut in due to the maximum allowable casing pressure being exceeded.

CONTROL PROCEDURES: Rigged up premix tank and mixed gel and barite while flowing gas through the degasser. Pumped mud with a high-pressure pumping unit and mud was circulated until the well was dead.

CAUSE OF BLOW/BLOWOUT: Swabbing. The kick was caused by swabbing the well while tripping out of the hole.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Careful attention to tripping speeds and pit volume changes.

HYDROCARBON AND/OR EQUIPMENT LOSS: 253 x 10^3 m^3 of sweet gas and undeterminable amount of salt water.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: SAMEDAN ET AL BARRHEAD 14-23-59-5

LOCATION 100/14-23-059-05 W5/0 LICENCE NO.: 0136375

OCCURRENCE

____ BLOW; X BLOWOUT DATE: 25 SEPTEMBER 1988 DURATION: 1.5 DAYS

OPERATION AT THE TIME OF OCCURRENCE

X DRILLING; ____ SERVICING; ____ OTHER

LICENSEE: SAMEDAN OIL OF CANADA, INC.

CONTRACTOR:

FORMATION: DEPTH: 201 m

FORMATION PRESSURE: ____ kPa or DRILLING FLUID DENSITY: 1110 kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: DRILLING

DESCRIPTION OF EVENT: After running and cementing, surface casing gas slowly began bubbling to surface from outside the surface casing.

CONTROL PROCEDURES: The gas interval was located by logging. The casing was then perforated and a cement squeeze was performed.

CAUSE OF BLOW/BLOWOUT: Shallow gas migration through curing cement.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Modify cementing procedures in this area.

HYDROCARBON AND/OR EQUIPMENT LOSS: Approximately 3 x 10^3 m^3 sweet gas.

INJURIES: None.

BLOW/BLOWOUT SUMMARY

WELL NAME: TEXACO STEEN RIVER 7-11-118-5

LOCATION 100/07-11-118-05 W6/0 LICENCE NO.: 0032014

OCCURRENCE

___ BLOW; X BLOWOUT DATE: 28 OCTOBER 1988 DURATION: 1 DAY

OPERATION AT THE TIME OF OCCURRENCE

___ DRILLING; ___ SERVICING; X OTHER

LICENSEE: TEXACO CANADA RESOURCES LTD.

CONTRACTOR:

FORMATION: KEG RIVER DEPTH: 1550 m

FORMATION PRESSURE: 13 000 kPa or DRILLING FLUID DENSITY: ___ kg/m³

STATUS OF WELL AT TIME OF OCCURRENCE: FLOWING OIL WELL

DESCRIPTION OF EVENT: An oil, gas and water flow from the surface casing vent was observed by the battery operator. The operator closed the surface casing vent and oil and gas flow came up around the surface casing.

CONTROL PROCEDURES: The well was killed by circulating over to produced water.

CAUSE OF BLOW/BLOWOUT: Equipment failure - Production casing failed due to external corrosion.

ACTIONS TO PREVENT FUTURE OCCURRENCES: Monitor casing integrity and perform remedial work if necessary in areas where external casing corrosion has been identified as a problem.

HYDROCARBON AND/OR EQUIPMENT LOSS: 32 m³ of oil, small volume of solution gas (5% H_2S).

INJURIES: None.

4.4 Historical Summary - Blow/Blowout Occurrences - 1988 to 1979

A brief summary of blow and blowout occurrences for the past 10 years appears in the following tabulation. The summary by well is in chronological order by year.

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
GNE ECSTASY PREVO 8-4-39-1 (W5M)	6 Jan 1988 (10 h)		Blow Servicing (shut-in oil)	14.7 m^3 of oil	Equipment failure
INVERNESS LITTLE BOW 7-6-15-8 (W4M)	6 Jan 1988 (1)	1 173	Blowout Drilling	Minimal hydrocarbon losses	Human error
NORCEN FERRIER 14-21-38-7 (W5M)	14 Jan 1988 (3)	2 820	Blowout Servicing (capped gas)	60 x 10^3 m^3 sweet gas	Equipment failure
CS ET AL CARROT 11-22-52-12 (W5M)	15 Jan 1988 (12 h)	2 236	Blowout Other (susp gas)	Approx 1.5 x 10^3 m^3 sweet gas	Equipment failure
C. NOREX ET AL NIPISI 8-5-79-8 (W5M)	16 Jan 1988 (3.5 h)	1 723	Blowout Other (flowing oil)	35 m^3 oil	Third-party damage
BANKENO NCO NEERLANDIA 9-26-61-5 (W5M)	2 Feb 1988 (4)	245	Blowout Other (standing)	Small volume of gas and 475 m^3 of water	Inadequate cementing, Low cement top
RANCHMEN'S ET AL GOODWIN 16-25-59-13 (W5M)	4 Feb 1988 (36)	1 651	Blow Other (flowing gas)	Approx 507 x 10^3 m^3 sweet gas, 3 m^3 condensate	Equipment failure, metallurgical defects

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
CDN-SUP LIEGE 6-13-92-21 (W4M)	4 Feb 1988 (1.5)	251	Blowout Other (flowing gas)	430 x 10^3 m^3 sweet gas	Third-party damage, grader operator struck wellhead
EXCEL ET AL SUTTON 6-35-92-3 (W6M)	16 Feb 1988 (3)	775	Blowout Drilling	125 x 10^3 m^3 sweet gas, drilling rig and related	Human error - inadequate tripping procedure
HB UNION KAYBOB 4-3-62-20 (W5M)	27 Apr 1988 (12 h)	2 171	Blowout Servicing (injection)		Unknown
ESSO 85 D1-15 COLD LAKE 108/13-12-65-4 (W4M)	17 May 1988 (8 h)	610	Blowout Other (steam/crude bitumen cycle)	12 m^3 oil	Overpressured formation
PRECAM ET AL JENNER 102/6-34-20-9 (W4M)	3 Jul 1988 (2)	968	Blowout Drilling	218.7 x 10^3 m^3/d sweet gas, flare line, manifold valves	Human error - swabbing
DOME ET AL STRACHAN 100/6-26-37-9(W5M)	6 Jul 1988 (1.3 h)	3 072	Blowout Other	Small volume sweet gas, wellhead	Human error (incorrect procedure) - improper purging

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
GULF ERSKINE 10-6-39-20 (W4M)	14 Jul 1988 (3.5)	1 637	Blow Other (pumping oil)	8.2 x 10^3 m^3 sour gas, 8 m^3 sour oil	Equipment failure
DEKALB BASHAW 7-31-42-22 (W4M)	16 Jul 1988 (1)	460	Blowout Other (capped gas)	2.9 x 10^3 m^3 sweet gas, wellhead	Third-party damage
PAN AM A-2 CLIVE 12-2-40-24(W4M)	29 Aug 1988	1 877	Blow Servicing (pumping oil)	15 x 10^3 m^3 H_2S gas (13%)	Equipment failure
ANDERSON ET AL CULP 16-2-79-24 (W5M)	13 Sep 1988 (20)	1 925	Blowout Drilling	1000 x 10^3 m^3 of gas (2% H_2S) chokes, rig manifold valves on flare line and separator	Human error - swabbing
SAMEDAN ET AL BARRHEAD 14-23-59-5 (W5M)	25 Sep 1988 (1.5)	201	Blowout Drilling	Approx. 3 10^3 m^3 sweet gas	Shallow gas migration
LOMAPETE ET AL CESSFORD 6-34-23-13 (W4M)	17 Oct 1988 (21)	996	Blowout Servicing (standing)	270 x 10^3 m^3 sweet gas, well	Equipment failure - downhole explosion
TEXACO STEEN RIVER 7-11-118-5 (W6M)	28 Oct 1988 (1)	1 550	Blowout Other (flowing oil)	32 m^3 oil, small volume of sour gas	Equipment failure

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
CDCOG ET AL POLLOCKVILLE 2-31-25-10 (W4M)	30 Oct 1988 (3 h)	988	Blowout Servicing (flowing gas)	850 x 10^3 m^3 sweet gas	Equipment failure
RENAISSANCE CESSFORD 3-6-23-9 (W4M)	20 Nov 1988 (1.5)	954	Blow Drilling	253 x 10^3 m^3 sweet gas	Swabbing/overpressured formation
KMG ET AL FERRYBANK 6-14-44-28 (W4M)	28 Nov 1988 (7 h)	1 679	Blowout Servicing (flowing oil/gas)	7 x 10^3 m^3 sweet gas, 0.1 m^3 oil	Human error
PEX FICKLE 10-5-51-19 (W5M)	23 Dec 1988 (5)	3 095	Blowout Other (Susp gas)	105 x 10^3 m^3 sweet gas, 13 m^3 condensate	Equipment failure
PALOMA ET AL BERRY 10-14-28-13 (W4M)	31 Dec 1988 (9 h)	982	Blowout Other (flowing gas)	8.5 x 10^3 m^3 sweet gas, adapter bonnet	Equipment failure

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
UNIGAS ET AL TOOGA 11-10-114-3 (W6M)	3 Jan 1987 (1)	200.6	Blowout Other (capped gas)	Small volume of sweet gas	Third-party damage
ESSO 85 D4-7 COLDLK 11-11-65-4 (W4M)	16 Jan 1987 (2 h)	480.0	Blowout Other (steam/crude bitumen cycle)	9 m^3 produced water	Equipment failure
DOME WILLESDEN GREEN 8-34-42-7 (W5M)	19 Jan 1987 (25 min)	1 550.0	Blowout Servicing (flow gas)	4 m^3 frac oil	Human error/failure to maintain well on vacuum
PCP ET AL LEEDALE 7-24-43-4 (W5M)	22 Jan 1987 (7 h)	2 094.0	Blowout Other (flow gas)	Small volume of sweet gas	Equipment failure
ESSO 85 D21-18 COLDLK 05/1-11-65-4 (W4M)	2 Mar 1987 (1.5 h)	542.0	Blowout Servicing (steam/crude bitumen cycle)	5.5 m^3 fluid	Equipment failure
DOME HB SUNDANCE 7-9-54-21 (W5M)	28 Mar 1987 (11)	3 204.0	Blowout Other (flow gas)	Approx. 16 x 10^3 m^3/d (50 ppm H_2S)	Inadequate well design
IMP JUDY CREEK 10-22BL-63-11 (W5M)	8 Apr 1987 (4 h)	2 802.0	Blowout Other (pump oil)	3 m^3 oil, 97 m^3 water	Equipment failure

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
IMP UNIT JUDY CREEK 6-8-64-10 (W5M)	8 Apr 1987 (2 h)	2 584.0	Blowout Other (pump oil - gas lift)	160 m^3 hydrocarbon	Inadequate well design
GULF POC COLEMAN 8-33-10-4 (W5M)	29 Apr 1987 (3)	4 009.0	Blowout Other (flow gas)	Unknow quantity of gas, Approx 1 m^3 oil/water (Sour 2%)	Inadequate well design
ESSO 85 D26-16 COLD LK 2-2-65-4 (W4M)	15 May 1987 (28.5 h)	582.0	Blowout Other (steam/crude bitumen cycle)	16 m^3 effluent	Equipment failure
ESSO 84 N40 LEM COLDLK EX AL/7-5-65-3 (W4M)	18 Jul 1987 (1 h)	543.4	Blowout Other (steam/crude bitumen cycle)	0.1 m^3 produced water	Equipment failure
HB ET AL DOWL 10-32-30-15 (W4M)	23 Jul 1987 (3 h)	924.8	Blowout Other (capped gas)	Small volume of gas	Third-party damage
ALTA ENVIRONMENT WATER WELL NE 1/4-36-110-4	1 Sep 1987 (55 h)	51.0	Blowout Drilling	110 x 10^3 m^3/d sweet gas, drill pipe and bit	Human error
WELLORE ET AL FBA 9-20-56-23 (W4M)	30 Sep 1987 (14 h)	986.0	Blowout Other (susp gas)	54 x 10^3 m^3 gas, 5 m^3 oil	Third-party damage

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
HUSKY WAINWRIGHT 8-31-44-4 (W4M)	10 Nov 1987 (20 min)	660.0	Blow Servicing (flow oil)	None	Human error - swabbing
HB PANAM FINA 6-35-57-19 (W5M)	19 Nov 1987 (5 h)	3 239.4	Blow Other (flow gas)	6.5 x 10^3 m^3 sour gas (30% H_2S)	Equipment failure
BP ET AL CHERHILL 6-23-56-6 (W5M)	23 Nov 1987 (2)	1 365.0	Blow Other (pump oil)	90 x 10^3 m^3 sweet gas, 8 m^3 produced water	Inadequate well design
ESSO 87 R4-8 COLD LK 6-23-65-4 (W4M)	24 Nov 1987 (22 h)	417.0	Blowout Drilling	Small volume of sweet gas	Abnormally charged formation
HUSKY STAPLE LLOYD 3-30-50-1 (W4M)	27 Nov 1987 (4 h)	655.0	Blow Servicing (susp oil)	Unknown	Human error - swabbing
ESSO 87 R4-8 COLDLK 6-23-65-4 (W4M)	2 Dec 1987 (5 h)	417.0	Blowout Other (standing)	Small volume of sweet gas	Unknown
SHELL TINDASTOLL 14-1-37-1	4 Dec 1987 (16 h)	254.0	Blow Drilling	Small volume of sweet gas	Human error - swabbing
TEXACO BIGORAY 6-12-52-9 (W5M)	15 Dec 1987 (6 h)	2 555.0	Blowout Other (pump oil)	19 m^3 oil	Equipment failure

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
RANCHMEN'S ET AL SYLAKE 14-35-37-4	25 Dec 1987 (9 h)	2 295.0	Blow Other (pump oil)	6 m^3 oil, small amount of gas (3350 ppm H_2S)	Equipment failure

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
ROYALITE FINA SADDLE HILLS 6-3-76-8 (W6M)	6 Jan 1986 (2.5)	1 464.0	Blowout, Other (capped gas)	Small volume of sweet gas	Equipment failure
PCP LINDBERGH 1A-7-55-5 (W4M)	11 Jan 1986 (10 min)	582.0	Blow Servicing (steam/crude bitumen cycle)	2 m³ oil/water mix	Equipment failure
DOME ET AL 5A2 LINDBERGH 02/5-10-56-6 (W4M)	14 Jan 1986 (9 h)	640.0	Blowout Drilling	20 x 10³ m³ sweet gas	Lost circulation, possibly caused by producing well in same location
TCRL ET AL RIBSTONE 14B-18-43-4 (W4M)	15 Jan 1986 (1 h)	756.0	Blow Drilling	Small volume of sweet gas	Unexpected gas pocket
OAK ET AL ENCHANT 14-27-13-15 (W4M)	14 Mar 1986 (1.5)	874.0	Blow Drilling	84 x 10³ m³ sweet gas, 95 m³ formation water	Swabbed well while tripping
BANFF GUYER BASHAW 10-6MU-42-22 (W4M)	12 Apr 1986 (8 h)	1 759.0	Blow Other (pump oil)	2 m³ oil 2 m³ salt water Small volume of sour gas (12% H_2S)	Equipment failure
ESSO 84 H2-7 COLD LAKE 05/15-21-65-4 (W4M)	12 Apr 1986 (1.25)	452.0	Blowout, Other (steam/crude bitumen cycle)	60 m³ mixture of oil, sand and water	Equipment failure
AMOCO BRAZEAU RIVER 10-9-45-12 (W5M)	25 Apr 1986 (7 h)	3 416.0	Blowout Servicing (capped gas)	Very small volume of sour gas (6.7% H_2S)	Equipment failure

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
MOBIL PR CARSON 6-12-62-12 (W5M)	13 May 1986 (12 h)	2 635.3	Blowout Other (susp)	5 m^3 oil, 139 m^3 produced water	Equipment failure
BUMPER ET AL ROSE CREEK 16-20-44-6 (W5M)	24 May 1986 (30 min)	2 240.5	Blow Servicing (capped gas)	Very small volume of sweet gas, 1 injury	Equipment failure
HB ET AL JACKFISH 02/11-36-59-21 (W5M)	30 May 1986 (5 min)		Blow Servicing (flow gas)	Very small volume of sour gas (18.6% H_2S)	Equipment failure
SUNCOR-WECO FORT KENT EX AJ/7-28-61-4 (W4M)	5 Jun 1986 (35 min)	366.6	Blowout Servicing (crude bitumen pumping)	11 m^3 oil/water mix	Procedural error
PEX WHITECOURT 10-18-60-11 (W5M)	27 Jun 1986 (2 h)	1 680.0	Blowout Other (flow gas)	Very small volume of sweet gas	Equipment failure
HUSKY CWWE EOR BEAVDM EX AA/14-27-60-3 (W5M)	2 Aug 1986 (6 h)	406.0	Blowout Other (steam/crude bitumen cycle)	1 m^3 oil	Equipment failure
DOME ET AL LARNE 10-1-117-4 (W6M)	6 Aug 1986 (11)	1 439.0	Blowout Other (standing oil)	112 x 10^3 m^3 sweet gas, well lost	Procedural error

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
PEX UNIT 1 KINSELLA B0/8-24-48-9 (W4M)	12 Aug 1986 (2)	677.6	Blowout Other (oil well/ oxygen flood)	Small volume of sweet gas	Equipment failure
COX TREND AMOCO CARSONW B4-12-62-13 (W5M)	21 Aug 1986 (12 h)	2 773.0	Blowout Other (oil)	16 m^3 oil/water mix	Equipment failure
ESSO 85 D22-2 COLD LAKE 03/7-11-65-4 (W4M)	22 Aug 1986 (3.75)	564.0	Blowout Other (steam/crude bitumen cycle)	400 m^3 oil/water mix	Equipment failure
PROPHET ET AL PEMBINA 02/6-25-49-6 (W5M)	28 Aug 1986 (6.5 h)	1 809.0	Blowout Other (standing oil)	0.5 m^3 oil, very small volume of gas (0.1% H_2S)	Equipment failure
LAC ET AL MINEHEAD 6-18-49-17 (W5M)	29 Aug 1986 (5)	2 436.0	Blowout Servicing (capped gas)	56 x 10^3 m^3 sweet gas, 12 m^3 frac oil, 2 fatalities, 8 injuries	Human error
DOME ET AL GORDONDALE 8-29-78-11 (W6M)	10 Sep 1986 (12 h)	1 878.0	Blow Other (oil)	0.5 m^3 oil 10 x 10^3 m^3 sour gas (1.5% H_2S)	Equipment failure
IMP UNIT CDN-SUP PEM INJ 6-25-49-6 (W5M)	21 Sep 1986 (1 h)	1 295.0	Blow Other (water inj)	3 m^3 salt water	Vehicle backed into wellhead

BLOW AND BLOWOUT OCCURRENCES - 1987 to 1978

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
ANADARKO ET AL HAYS 10-29-13-15 (W4M)	26 Oct 1986 (4 h)	813.8	Blowout Other (capped gas)	21 x 10^3 m^3 sweet gas	Third-party damage
CDGOC TEEN MUSKEG EX AJ/16-9-95-7 (W4M)	18 Nov 1986 (5 h)	185.0	Blowout Servicing (crude bitumen pump)	2.5 m^3 oil/water mix	Procedural error
WESTMIN BEAUVALLON 16-24-53-8 (W4M)	26 Nov 1986 (20 h)	490.0	Blowout Other (capped gas)	Small volume of sweet gas	Third-party damage
LOMALTA TABERS 02/2-17-7-16 (W4M)	28 Nov 1986 (17)	995.0	Severe abnormal pressure encountered Drilling	No hydrocarbon loss	Abnormally high pressure zone, caused by adjacent water injection project
ESSO 86 J12-3 COLD LAKE 03/9-15-65-4 (W4M)	13 Dec 1986 (1)	465.0	Blowout Drilling	Very small volume of sweet gas	Abnormally high pressure zone, caused by adjacent steam injected project

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
SUNCOR WECO K3C FTKENT EX 9-19-61-4 (W4M)	10 Jan 1985 (3 h)	380.0	Blowout Other (steam/crude bitumen cycle)	2 m³ crude bitumen and water (steam)	Equipment failure
PCI BITU 5-85-23 OV 4-19-96-10 (W4M)	19 Jan 1985 (5)	26.0	Blowout Drilling (tripping)	No estimate of sweet hydrocarbon loss, major rig damage, 2 injuries	Unexpected shallow gas pocket
SUNCOR WECO 15E FTKENT EX 15-20-61-4 (W4M)	23 Jan 1985 (4.5 h)	340.0	Blowout Other (steam/crude bitumen cycle)	2 m³ crude bitumen and produced water, minor piping damage	Equipment failure
PCP ALDERSON 9-3-16-15 (W4M)	23 Jan 1985 (1)	1 026.0	Blowout Other (flow oil)	5 m³ oil (0.6% H_2S in gas), wellhead damage	Equipment failure
CHEVRON MGSU #1 MITSUE 13-4-70-3 (W5M)	5 Feb 1985 (9 h)	890.0	Blow Drilling	No estimate of sweet hydrocarbon loss	Lost circulation
UNIGAS ET AL TOOGA 7-15-114-4 (W6M)	3 Mar 1985 (2)	218.0	Blowout Other (flow gas)	30 x 10³ m³ sweet gas, wellhead damaged by fire	Static electricity
PARA ET AL LIEGE 7-26-94-18 (W4M)	5 Mar 1985 (3.5)	285.0	Blowout Other (capped gas)	90 x 10³ m³ sweet gas, wellhead damage	Third-party damage, van hit the wellhead

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
CDNOXY ET AL CROSSE 10-22-27-29 (W4M)	14 Mar 1985 (3 h)	2 702.0	Blow Other (flow gas)	1 m³ gas (34% H_2S)	Equipment failure
DOME LINDBERGH 5-18-55-5 (W4M)	19 Apr 1985 (4.5 h)	592.0	Blowout Other (steam/crude bitumen cycle)	50 m³ crude bitumen, wellhead damage	Equipment failure
PCP ALDERSON 2-4-62-2 (W5M)	24 Apr 1985 (4 h)	738.0	Blowout Other (capped gas)	12.5 x 10³ m³ sweet gas	Third-party damage
HB UNION KAYBOBS 2-4-62-20 (W5M)	3 May 1985 (6 h)	2 155.0	Blowout Other (pump oil)	24 m³ oil, 6 x 10³ m³ gas (2% H_2S), wellhead damage	Third-party damage
LANDBANK ET AL KILLAM 11-7-43-10 (W4M)	21 Jun 1985 (8 h)	637.0	Blowout Other (flow gas)	3 x 10³ m³ sweet gas, minor wellhead damage	Static electricity
CO-ENERCO ET AL CARROT 6-21-53-13 (W5M)	4 Jul 1985 (0.5 h)	2 130.0	Blow Servicing	5 m³ load oil, 2.3 x 10³ m³ gas	
CDN-SUP KEGR 10-21-103-4 (W6M)	19 Jul 1985 (4)	487.0	Blowout Other (capped gas)	150 x 10³ m³ sweet gas, wellhead damage	Third-party damage

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
JEFF LAKE ET AL JOFFRE 12-20-38-26 (W4M)	24 Jul 1985 (2)	2 209.0	Blowout Other (pump oil)	10 x 10^3 m^3 gas (4% H_2S)	Equipment failure
WESTMIN LINDBERGH 13-05-55-5 (W4M)	26 Jul 1985 (0.5 h)	513.0	Blowout Servicing (crude bitumen)	2 m^3 crude bitumen, 2 x 10^3 m^3 sweet gas, crop damage	Well inadequately killed
BRACELL MOBIL HAYNES 3-14-38-24 (W4M)	27 Jul 1985 (3 h)	1 853.0	Blow Other (pump oil)	No estimate of hydrocarbon loss (15% H_2S)	Equipment failure
PETROMK ET AL DRUM 10-28-30-19 (W4M)	2 Aug 1985 (13 h)	1 289.0	Blowout Servicing (flow gas)	28 x 10^3 m^3 sweet gas, wellhead damage, 1 injury	Equipment failure
SUNCOR WECO M2D FTKENT EX 11-28-61-4 (W4M)	4 Aug 1985 (6 h)	557.0	Blowout Other (steam/crude bitumen cycle)	8 m^3 crude bitumen, minor wellhead damage	Down-hole communication between wells
SHELL 60 PRISP CADOT EX 27/AB 13-16-85-18 (W5M)	10 Sep 1985 (2 h)	551.0	Blowout Servicing (steam/crude bitumen cycle)	5 m^3 crude bitumen	Well inadequately killed
DOME ET AL LINDBERGH 15-18-55-5 (W4M)	5 Oct 1985 (5 h)	581.0	Blowout Other (steam/crude bitumen cycle)	No estimate of hydrocarbon loss	Equipment failure

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
DOME HOME AMBER 12-36-115-7 (W6M)	1 Nov 1985 (5)	1 523.0	Blow Drilling	No hydrocarbon loss, small amount of gas (2% H_2S)	Hole conditions, fluid density inadequate
WECO 10 FT KENT EX 7-28-61-4 (W4M)	7 Nov 1985 (13.5 h)	334.0	Blowout Servicing (steam/crude bitumen cycle)	0.5 m^3 oil, 60 m^3 steam and produced water	Unexpected sand bridge
SUNCOR CWWE M2H FTKENT EX 14-28-61-4 (W4M)	10 Nov 1985 (1.25 h)	350.0	Blow Other (steam/crude bitumen cycle)	0.2 m^3 crude bitumen, 6.2 m^3 produced water	Equipment failure
HEWITT CHEVRON GSPIKE 2-35-51-27 (W4M)	19 Nov 1985 (6 h)	1 320.0	Blowout Other (capped gas)	No estimate of hydrocarbon loss, small amount of gas (trace H_2S)	Equipment failure
SUNCOR WECO M2F FTKENT 11-28-61-4 (W4M)	4 Dec 1985 (1.75 h)	340.0	Blowout Servicing (steam/crude bitumen cycle)	3 m^3 crude bitumen, 13 m^3 salt water	Procedural error
AQUIT MOBIL RAINBOWS 7-34-107-10 (W6M)	9 Dec 1985 (6)	1 852.0	Blowout Servicing	170 x 10^3 m^3 gas (20% H_2S), 50 m^3 condensate, 1 injury	Equipment failure

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
AMOCO BEAVERDAM EX 16-13-59-2 (W4M)	21 Dec 1985 (0.5 h)	546.0	Blow Other (steam/crude bitumen cycle)	2 m³ crude bitumen and water, minor wellhead damage	Equipment failure
DOME ET AL 4B LIND EX 4-24-55-6 (W4M)	25 Dec 1985 (0.75 h)	585.0	Blowout Other (steam/crude bitumen cycle)	No losses	Inadequate cementing procedures on production casing

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
DOME ET AL FERRIER 8-33-38-7 (W5M)	3 Feb 1984 (2.5)	2 610.0	Blowout Drilling (coring)	706 x 10^3 m^3 sweet gas, manifold	Abnormal pressure, equipment failure, inadequate mud weight
PEMBINA ET AL FERRIER 6-29-38-7 (W5M)	14 Feb 1984 (1.5)	2 687.0	Blowout Drilling (tripping)	470 x 10^3 m^3 sweet gas, 150 barrels condensate	Swabbing and procedural error
PAN AM AP-2 SWAN H 02-12-67-11 (W5M)	3 Mar 1984 (30 min)	2 656.0	Blowout Other (pump oil)	No estimate of sweet hydrocarbon loss	Third-party damage, backhoe hit wellhead
CS WESTCOAST A4 SUGDEN EX AA/6-13-63-8 (W4M)	19 Mar 1984 (3.5)	382.0	Blowout Servicing (tripping)	No estimate of sweet hydrocarbon loss	Swabbing, failure to keep hole full, incorrect procedure to shut in well
PCP ET AL PRINCESS 4-4-19-10 (W4M)	6 Jun 1984 (0.5)	977.0	Blowout Drilling (tripping)	305 x 10^3 m^3 sweet gas, shock hose	Swabbing and/or failure to keep hole full, equipment failure
CS CARROT 10-26-52-12 (W5M)	25 Jun 1984 (0.5)	2 117.0	Blowout Other (pump oil)	4.5 m^3 oil, 4 x 10^3 m^3 sweet gas, wellhead damaged by fire	Equipment failure
GASCAN ET AL MITSUE 14-4-69-3 (W5M)	1 Jul 1984 (6 h)	1 692.0	Blowout Drilling	42 x 10^3 m^3 sweet gas	Inadequate cementing, incorrect procedure

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
IMP JUDY CREEK 10-3-64-11 (W5M)	5 Sep 1984 (6 h)	2 696.0	Blowout Other (pump oil)	16 m³ oil, 70 m³ water and minor gas, wellhead damage	Third-party damage, truck ran over well
DRUMMOND ET AL CLARESHOLM 6-30-12-25 (W4M)	24 Sep 1984 (3.5)	2 043.0	Blowout Other (flow gas)	830 x 10³ m³ gas (1% H_2S), wellhead damage	Procedural error - incorrect procedure injecting methanol
AQUIT AMOCO RICINUS 7-15-34-8 (W5M)	10 Oct 1984 (0.5)	4 121.0	Blow Other (flow gas)	No estimate of hydrocarbon loss, small volume of gas (34% H_2S)	Equipment failure
PAN AM CALSTAD PIGEON LAKE IR 6 16-24-46-28 (W4M)	19 Oct 1984 (7 h)	2 155.0	Blowout Servicing	No estimate of hydrocarbon loss, wellhead damage	Equipment failure
DOME ET AL STRACHAN 13-8-37-9 (W5M)	23 Oct 1984 (1)	3 312.0	Blowout Servicing (frac job)	No estimate of sweet hydrocarbon loss	Procedural error
CS GRANADA 6-30-52-11 (W5M)	25 Oct 1984 (6 h)	2 109.0	Blowout Other (pump oil)	2 m³ oil, 500 m³ sweet gas	Equipment failure
DEKALB ET AL NEVIS 10-35-40-22 (W4M)	26 Oct 1984 (0.5)	376.0	Blowout Servicing (frac job)	1.4 x 10³ m³ sweet gas, minor wellhead damage	Equipment failure

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
HB BRAZEAU RIVER 7-31-46-14 (W5M)	29 Nov 1984 (0.5)	3 655.0	Blow Other (flow gas)	5300 m³ gas (19.7% H_2S)	Equipment failure
RANGER GULF EDSON 11-11-53-20 (W5M)	30 Nov 1984 (5 min)	2 111.0	Blow Other (flow gas)	No estimate of sweet hydrocarbon loss	Equipment failure
GULF RAINBOW 11-36-110-6 (W6M)	14 Dec 1984 (30 min)	1 650.0	Blowout Other (capped gas)	No estimate of hydrocarbon loss (0.96% H_2S), 1 injury	Third-party damage, truck moving service rig damaged wellhead
UNION SLAVE 14-36-83-14 (W5M)	15 Dec 1984 (5 h)	1 750.0	Blowout Other (flow oil)	No estimate of sweet hydrocarbon loss, minor wellhead damage	Third-party damage, 4-wheel drive seismic tractor backed into well

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
GASCOME N. FRONTIER RAIN S 10-22-107-10 (W6M)	30 Jan 1983 (0.5)	1 961.0	Blowout Servicing (rigging up)	9.5 m³ oil, 1400 m³ gas (trace H_2S), minor wellhead damage	Service rig backed into well, broke valve off
TENN N-6 HUSSAR 15-3-25-21 (W4M)	20 Feb 1983 (1)	1 475.0	Blowout Other (capped oil)	20 m³ oil, 18 400 m³ sweet gas	Equipment failure
UNION BOYER 11-10-102-24 (W5M)	26 Feb 1983 (1 h)	357.0	Blowout Other (flow gas)	No estimate of sweet hydrocarbon loss, minor wellhead damage	Third-party damage, grey nipple knocked off wellhead by caterpillar tractor
CONGASCOME ET AL SHEKILIE 12-14-118-8 (W6M)	27 Feb 1983 (9)	1 794.0	Blowout Drilling (logging)	610 x 10³ m³ gas (2% H_2S)	Lost circulation
SUNCOR ET AL FTKENT 3-15-61-5 (W4M)	13 Mar 1983 (1)	343.0	Blow Drilling (tripping)	No estimate of sweet gas loss	Swabbing, procedural error (drill pipe and collars dropped down hole)
QUINTANA ET AL GOLDEN 9-24-86-15 (W5M)	16 Mar 1983 (2)	1 620.0	Blow Drilling (cementing)	50 x 10³ m³ sweet gas	Inadequate mud density
HOME ESSO KITSCOTY 3B-2-51-2 (W4M)	17 Mar 1983 (4)	603.0	Blowout Other (steam/oil cycle)	330 m³ water, 220 m³ oil, no estimate of sweet gas, wellhead damage	Equipment failure

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
HB UNION KAYBOB S 10-5-62-20 (W5M)	22 Mar 1983 (4 h)	2 177.0	Blowout Other (pump oil)	13 m^3 oil, 13 300 m^3 gas (1.5% H_2S)	Equipment failure
PETROMK ET AL UTIKUMA 2-16-81-9 (W5M)	11 May 1983 (4 h)	1 744.0	Blowout Other (steam/crude bitumen cycle)	35 m^3 oil, 400 m^3 gas, minor wellhead damage	Third-party damage, casing valve broken off wellhead by truck
PCP GLEICHEN 6-11-23-21 (W4M)	22 May 1983 (7 h)	801.0	Blowout Servicing (re-installing wellhead)	No estimate of sweet hydrocarbon loss, 1 injury	Wellhead blown off, cross-threaded
YORK 2TV 3 IN DECALTA 6-20-18-2 (W5M)	28 Jun 1983 (3 min)	2 446.0	Blow Servicing (tripping)	No estimate of sweet hydrocarbon loss, 3 injuries	Trapped gas in tubing, suddenly released at surface
NORCEN K9 PROVO EX C1 6-17-37-1 (W4M)	6 Jul 1983 (1)	743.0	Blowout Other (air inj)	No estimate of sweet hydrocarbon loss, wellhead and tubing damage	Direct cause unknown, 3 joints tubing blown out of well
MERLAND DEMAY 1-17-48-19 (W4M)	18 Jul 1983 (2)	481.0	Blowout Other (susp gas)	No estimate of sweet hydrocarbon loss	Inadequate cement job on production casing string (surface casing vent blow)

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
CS WESTCOAST SUGDEN EX 6-13-63-8 (W4M)	2 Aug 1983 (1)	380.0	Blow Servicing	2 m^3 sweet gas	Equipment failure
GULF AMOCO CAROLINE 8-17-36-6 (W5M)	5 Sep 1983 (2)	2 529.0	Blow Drilling (tripping)	No estimate of sweet hydrocarbon loss	Swabbing
GCON ET AL AQUIT LENDRUM 6-1-48-19 (W5M)	17 Sep 1983 (5 min)	95.0	Blow Servicing (re-entry)	No estimate of sweet hydrocarbon loss, 2 injuries	Unanticipated high pressure gas below bridge plug
SIGNALTA ET AL PEMBINA 4-31-50-6 (W5M)	28 Sep 1983 (6 h)	1 712.0	Blowout Other (susp gas)	14 000 m^3 gas, minor water	Third-party damage, casing valve broken off wellhead by truck
IMP JUDY WEST 10-18-63-11 (W5M)	3 Nov 1983 (2 h)	2 657.0	Blow Other (pump oil)	30 m^3 oil, 4200 m^3 sweet gas	Equipment failure
TEXACO C4 WIZARD 8-16MU-48-27 (W4M)	8 Nov 1983 (1)	1 886.0	Blowout Servicing (installing BOPs)	740 x 10^3 m^3 sweet gas	Equipment failure
PACIFIC AMOCO RICINUS 15-12-36-9 (W5M)	21 Nov 1983 (1)	2 617.0	Blowout Other (flow gas)	5000 m^3 sweet gas	Equipment failure

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
ANDEX ET AL PEMBINA 14-11-50-4 (W5M)	22 Nov 1983 (0.5)	1 585.0	Blow Drilling	No estimate of sweet hydrocarbon loss	Inadequate mud density

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
CANHUNTER ET AL MUDDY 7-1-68-12 (W6M)	14 Jan 1982 (2 min)	2 441.0	Blow Servicing (wireline operations)	No estimate of sweet hydrocarbon loss, wireline truck, 3 pick-ups, minor service rig damage, 5 injuries	Equipment failure
HB ZAMA NORTH 12-11-116-6 (W6M)	14 Jan 1982 (1.5)	1 546.0	Blowout Other (flow oil)	14 m³ oil, 7 m³ gas (9% H_2S)	Equipment failure
DOME SULPETRO VALHALLA 8-23-74-9 (W6M)	18 Jan 1982 (4)	2 042.0	Blowout Drilling (tripping)	3600 x 10³ m³ gas (trace H_2S), 150 barrels condensate	Failure to keep hole full while tripping out, followed by BOP failure
SUNCOR WECO FT KENT EX 4-28-61-4 (W4M)	26 Jan 1982 (1)	396.0	Blow Servicing	No estimate of sweet hydrocarbon loss, 1 injury	Equipment failure
MYROL BVX STETN 6-19-39-19 (W4M)	28 Jan 1982 (1)	1 345.0	Blowout Other (flow gas)	280 x 10³ m³ sweet gas, minor wellhead damage	Third-party damage
C&T ET AL MEDR 14-20-39-3 (W5M)	2 Feb 1982 (1)	2 142.0	Blowout Servicing (tripping)	33 m³ oil, 450 m³ gas, 8 m³ salt water	Underbalanced fluid column in wellbore, insufficient kill fluid density
CANSTAR CALUMET OV 2-24-98-12 (W4M)	11 Feb 1982 (13)	65.0	Blowout Drilling	85 x 10³ m³ sweet gas, rig burned	Unexpected shallow gas sand, no BOPs installed

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
GAO JOLI FOU 7-32-80-20 (W4M)	14 Feb 1982 (0.5)	369.0	Blow Other (crude bitumen)	3 m³ oil	Equipment failure
CANTERRA ET AL RAINBOW 8-15-109-8 (W6M)	3 Mar 1982 (6)	1 782.0	Blow Drilling (tripping)	No estimate of hydrocarbon loss (trace H_2S)	Failure to keep hole full
HB SHEKILIE 4-11-118-8 (W6M)	10 Mar 1982 (2.5)	1 737.0	Blowout Servicing (removing wellhead)	2 m³ oil, 300 m³ gas (trace H_2S), wellhead and service rig damage	Winch line parted, dropping horsehead onto wellhead
UNIGAS ET AL SOUSA 6-11-112-4 (W6M)	15 Mar 1982 (0.5)	260.0	Blowout Other (standing gas)	No estimate of sweet hydrocarbon loss, wellhead damage	Third-party damage
UNION SLAVE 8-23-84-14 (W5M)	23 Mar 1982 (0.5)	78.0	Blow Drilling	No estimate of sweet hydrocarbon loss	Unexpected shallow gas zone
PROCOR FT SASK LPG STORAGE 16D-1-56-22 (W4M)	11 Apr 1982 (1)	1 909.0	Blowout Other (storage)	875 m³ butane, 3 buildings and pumps, 1 injury	Equipment failure
CIGOL BIG LK 10-22-53-26 (W4M)	29 Apr 1982 (19)	1 430.0	Blowout Other (susp gas)	No estimate of sweet hydrocarbon loss	Lake ice damaged equipment

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
PCP ALDERSON 14-15-15-15 (W4M)	16 May 1982 (0.5)	762.0	Blow Drilling (tripping)	No estimate of sweet hydrocarbon loss	Failure to keep hole full while tripping
CAIRN ET AL WAYNE 6-10-27-20 (W4M)	1 Jun 1982 (1)	1 424.0	Blowout Other (flow oil)	No estimate of sweet hydrocarbon loss, wellhead and pump-jack damage	Equipment failure
AMERADA STURLS 1-20-69-22 (W5M)	10 Jun 1982 (0.5)	2 602.0	Blow Other (flow oil)	7 m³ oil, 1.4 x 10³ m³ gas (9% H_2S)	Equipment failure
DIASHAM AMOCO SPRUCE V 7-14-67-19 (W4M)	14 Jul 1982 (1)	370.0	Blowout Other (flow gas)	2.8 x 10³ m³ sweet gas, minor wellhead damage	Foremost all-terrain vehicle ran into wellhead, broke off 12-mm valve
IMP HB FENNBV 2-26-36-20 (W4M)	3 Sep 1982 (1)	1 594.0	Blowout Servicing (rigging up)	2.5 m³ oil, 180 m³ gas (1.5% H_2S)	Well improperly killed
REGAL ET AL PEMBINA 6-11-47-3 (W5M)	7 Sep 1982 (1)	285.0	Blow Other (pump oil)	No estimate of sweet hydrocarbon loss	Inadequate cement top behind production casing (surface casing vent blow)
DECALTA LEDUC 10-36-48-26 (W4M)	17 Sep 1982 (1)	1 385.0	Blowout Other (standing gas)	No estimate of sweet hydrocarbon loss	Third-party damage

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
GULF ET AL CRIMSON 7-5-38-8 (W5M)	21 Sep 1982 (11)	2 926.0	Blow Drilling (coring)	250 x 10^3 m^3 sweet gas	Abnormal formation pressure
CAMP TAMERACK LADCO WW NW 1/4-26-70-6 (W6M)	14 Oct 1982 (1)	198.0	Blowout Drilling	5 x 10^3 m^3 sweet gas	Water well driller had no BOP equipment
AMOCO DOME BRAZEAU RIVER 13-12-48-12 (W5M)	17 Oct 1982 (67)	3 066.0	Blowout Drilling (coring)	150 to 220 x 10^6 m^3 gas (includes 25% H_2S and 100 to 160 x 10^3 m^3 gas equivalent of condensate), drilling rig, 2 deaths (well control personnel), 300 hectares of forest	Combination of unsatisfactory practices and equipment failures (see Lodgepole Blowout Report D 84-9, Section 12.1.1)
WESTCOAST AEC SUFFIELD 5-10-20-8 (W4M)	6 Nov 1982 (2)	887.0	Blow Drilling (tripping)	25 x 10^3 m^3 sweet gas, minor rig damage, 3 injuries	Failure to keep hole full
FIRST DEV ET AL PEMBINA 4-28-50-12 (W5M)	19 Nov 1982 (1 h)	100.0	Blow Servicing (re-enter abandoned well)	No estimate of sweet hydrocarbon loss	Abnormal pressure due to inadequate abandonment

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
MOBIL PRISM RAIN 12-13-110-6 (W6M)	20 Nov 1982 (11)	1 853.0	Blowout Servicing (installing wellhead)	275 x 10^3 m^3 gas (1.5% H_2S), service rig and wellhead damage	Well inadequately killed
SUN MEDR 12-8-39-3 (W5M)	26 Nov 1982 (30 min)	2 206.0	Blow Servicing (hot oil job)	2 m^3 oil	Polish rod hydrauliced out of stuffing box and broke off
GULF ET AL FERRIER 6-18-38-8 (W5M)	1 Dec 1982 (1)	2 930.0	Blow Drilling (coring)	130 x 10^3 m^3 sweet gas	Abnormally pressured formation
SECURITY GARRS 6-21-33-3 (W5M)	2 Dec 1982 (1)	1 938.0	Blow Servicing (frac job)	15 m^3 oil	Equipment failure

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
LUSCAR ET AL FORESTBURG 4-29-41-15 (W4M)	9 Jan 1981 (0.5)	174.0	Blow Drilling (tripping)	No estimate of sweet hydrocarbon loss	Swabbing
TOTAL ATMORE 3-34-67-16 (W4M)	10 Jan 1981 (15 min)	356.0	Blow Drilling (tripping)	No estimate of sweet hydrocarbon loss, 1 injury	Failure to keep hole full
ESSO COLD LAKE 27A 6-27-64-3 (W4M)	20 Jan 1981 (2)	525.0	Blowout Other (crude bitumen)	No estimate of sweet hydrocarbon loss	Equipment failure (casing)
MERLAND ET AL KINSELLA 6-2-46-8 (W4M)	1 Feb 1981 (2)	638.0	Blowout Servicing (installing BOPs)	210 x 10^3 m^3 sweet gas	Well improperly killed
VOYAGER ET AL NORRIS 9-5-54-18 (W4M)	7 Feb 1981 (2 h)	188.0	Blow Drilling (tripping)	No estimate of sweet hydrocarbon loss	Swabbing
CS RAINBOW 3-32-109-5 (W6M)	15 Feb 1981 (2 h)	1 367.0	Blow Drilling (tripping)	6 m^3 oil, no estimate of sweet gas, minor rig damage, 1 injury	Failure to keep hole full

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
CHEROKEE RETLAW 6-32-11-18 (W4M)	26 Feb 1981 (1.5)	1 075.0	Blow Drilling (tripping)	250 x 10^3 m^3 sweet gas	Swabbing
POC ET AL OBED 2-22-52-22 (W5M)	28 Mar 1981 (1 h)	4 225.0	Blow Servicing (logging)	6 x 10^3 m^3 gas (32% H_2S), minor service rig fire damage	Equipment failure
HB ET AL BRAZR 8-7-48-13 (W5M)	25 Apr 1981 (6)	3 379.0	Blow Drilling (tripping)	No estimate of hydrocarbon loss (0.6% H_2S)	Swabbing
PETROFINA TEST HOLE B5 13-6-51-7 (W5M)	15 May 1981 (1)	201.0	Blowout Drilling	28 x 10^3 m^3 sweet gas, fire damage to rig, 2 injuries	Air drilling with no diverter or BOPs
BANFF GUYER BASHAW 10-6MU-42-22 (W4M)	2 Jun 1981 (4)	1 760.0	Blowout Other (pump oil)	1 x 10^3 m^3 gas, 1 m^3 oil (12% H_2S)	Equipment failure
CHAMPLIN WHITECOURT 9-17-60-11 (W5M)	24 Jun 1981 (1)	1 602.0	Blow Other (capped gas)	40 x 10^3 m^3 sweet gas	Inadequate cement job on production casing string (surface casing vent blow)
HUBER TWINING 2-18-32-24 (W4M)	4 Jul 1981 (6)	1 684.0	Blowout Other (susp oil)	8 x 10^3 m^3 sweet gas, 4 m^3 oil, minor wellhead damage	Third-party damage

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
CLP COLD LAKE 9-7-63-2 (W4M)	14 Jul 1981 (1)	260.0	Blowout Other (flow gas)	10 x 10^3 m^3 sweet gas	Third-party damage
BP ET AL LAMBERT 15-33-41-23 (W5M)	22 Jul 1981 (13)	4 414.0	Blow Drilling	No estimate of sweet hydrocarbon loss	Lost circulation
GAO ET AL FERRIER 10-1-40-9 (W5M)	23 Jul 1981 (1)	2 683.0	Blow Drilling	No estimate of sweet hydrocarbon loss	Abnormally pressured formation
HUSKY LLOYD 13-15-51-1 (W4M)	22 Aug 1981 (0.5)	49.0	Blow Drilling	No estimate of sweet hydrocarbon loss	Unexpected shallow gas pocket
GULF PECO 7-30-47-15 (W5M)	15 Sep 1981 (30 min)	2 503.0	Blow Drilling (fishing)	No estimate of sweet hydrocarbon loss	Pipe parted while jarring stuck DST tools
TEXACO ATHABASCA I-23 12-15-88-8 (W4M)	16 Sep 1981 (12)	354.0	Blowout Other (air inj)	No estimate of sweet hydrocarbon loss, casing and minor wellhead damage	Equipment failure
ROZSA KNAPPEN 9-6-2-11 (W4M)	25 Sep 1981 (2)	794.0	Blow Drilling (tripping)	500 x 10^3 m^3 sweet gas	Failure to keep hole full
SUNCOR COVEY NO. 11-7 11-7-47-27 (W4M)	16 Oct 1981 (1 h)	2 159.0	Blowout Servicing (tripping)	No estimate of sweet hydrocarbon loss	Well not properly killed

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
CHEVRON BLGU 3 KAYBOB S 4-35-58-18 (W5M)	1 Nov 1981 (0.5)	3 396.0	Blowout Servicing (tripping)	125 x 10^3 m^3 gas (18% H_2S), 125 m^3 condensate, 16 m^3 salt water	Well not properly killed
BA PAN-AM RHONDA SWANH 4-14-66-11 (W5M)	8 Nov 1981 (1)	2 593.0	Blowout Other (pump oil)	No estimate of sweet hydrocarbon loss	Equipment failure
HB SHEKILIE 9-16-118-8 (W6M)	18 Nov 1981 (4)	1 548.0	Blowout Drilling (circulating)	1600 x 10^3 m^3 gas (0.66% H_2S), rig destroyed	Lost circulation
ASHLAND ET AL PEMBINA 11-33-50-8 (W5M)	22 Nov 1981 (1)	1 914.0	Blowout Other (standing gas)	No estimate of sweet hydrocarbon loss	Equipment failure
PARA ET AL WILD RIVER 10-8-55-25 (W5M)	30 Nov 1981 (2)	2 665.0	Blowout Other (standing oil)	No estimate of sweet hydrocarbon loss, wellhead damage	Equipment failure
IMP CDN SUP PEMBINA 16-29BR-48-6 (W5M)	10 Dec 1981 (1)	1 404.0	Blow Servicing (installing BOPs)	No estimate of sweet hydrocarbon loss	Wellhead froze, bonnet on master valve split

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
DOME AMOCO EUREKA 3-33-82-10 (W6M)	2 Jan 1980 (1)	1 916.0	Blowout Other (flow gas)	60 x 10^3 m^3 sweet gas wellhead damage, 1 injury	Equipment failure
PAN-AM CANSO A-1 NITON 12-15-55-13 (W5M)	9 Jan 1980 (1)	1 972.0	Blowout Servicing (clean-out job)	No estimate of sweet hydrocarbon loss, wellhead damage	Equipment failure
WESTCOAST ET AL BUFFALO 14-17-22-6 (W4M)	31 Jan 1980 (1)	775.0	Blow Drilling (tripping)	28 x 10^3 m^3 sweet gas	Failure to keep hole full, mud density inadequate
PANCANA MURPHY ATLEE 4-19-21-5 (W4M)	5 Feb 1980 (6)	840.0	Blow Drilling (tripping)	No estimate of sweet hydrocarbon loss	Lost circulation
BLAKE ET AL STEEN 10-9-112-1 (W6M)	7 Feb 1980 (25)	70.0	Blowout Drilling	No estimate of sweet hydrocarbon loss, major rig fire damage, 2 injuries	Unexpected shallow gas sand
BLAKE ET AL SOUSA 10-11-112-2 (W6M)	2 Mar 1980 (1)	265.0	Blow Drilling	No estimate of sweet hydrocarbon loss	Inadequate mud density
WESTGROWTH ET AL VIRGO 12-36-114-6 (W6M)	11 Mar 1980 (1)	1 501.0	Blow Other (susp well)	1 m^3 oil, wellhead	Third-party damage

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
CHEVRON STEELE 13-20-65-24 (W4M)	18 Mar 1980 (0.5)	1 233.0	Blow Drilling (tripping)	No estimate of sweet hydrocarbon loss	Swabbing, failure to keep hole full
CANHUNTER TEXACO ELM 10-35-71-13 (W6M)	19 Jun 1980 (2)	2 007.0	Blowout Servicing (installing BOPs)	5.7 x 10^6 m^3 sweet gas	Well not properly killed
DOME MORGAN 6B-35-51-4 (W4M)	5 Jul 1980 (2 h)	586.0	Blowout Servicing (installing BOPs)	9 m^3 oil	Swabbing
NUGATE OAK PCP ALDERSON 8-14-16-15 (W4M)	29 Jul 1980 (1)	1 041.0	Blow Drilling (tripping)	10 m^3 oil, 28 x 10^3 m^3 sweet gas	Failure to keep hole full and/or swabbing
DOME PECO 6-1-47-16 (W5M)	10 Sep 1980 (1)	3 864.0	Blowout Other (susp gas)	No estimate of hydrocarbon loss (20% H_2S)	Casing valves left open, tubing parted and gas escaped out open valve
HOME PACIFIC KNAPPEN 16-29-1-11 (W4M)	12 Sep 1980 (1)	760.0	Blow Servicing (rigging up)	29 x 10^3 m^3 sweet gas	Equipment failure
WHITEHALL BUX ZAMA 4-20-116-6 (W6M)	18 Sep 1980 (2)	1 409.0	Blow Other (susp gas)	100 x 10^3 m^3 gas (2% H_2S)	Production casing failure due to corrosion (surface casing vent blow)

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
ESSO CHIEFCO RILEY 6-25-42-17 (W5M)	24 Sep 1980 (1)	5 300.0	Blow Drilling	No estimate of hydrocarbon loss (trace H_2S)	Abnormally pressured formation
CHEVRON CLARK 10-2-59-18 (W5M)	2 Oct 1980 (1)	3 272.0	Blow Servicing (killing well)	No estimate of hydrocarbon loss (8% H_2S), minor rig damage	Equipment failure
HB SWIMMING 6-8-52-6 (W4M)	8 Oct 1980 (1 h)	680.0	Blow Drilling	No estimate of sweet hydrocarbon loss	Lost circulation
CLARION ET AL BONNYVILLE 6-36-60-6 (W4M)	11 Oct 1980 (2 h)	327.0	Blowout Other (susp gas)	No estimate of sweet hydrocarbon loss, minor wellhead damage	Third-party damage
FINA AMOCO HB WIND 9-2-61-16 (W5M)	17 Oct 1980 (4 h)	2 533.0	Blow Servicing (tripping)	No estimate of hydrocarbon loss (20% H_2S)	Stabbing valve in tubing left open, well kicked in
TREND FBA 13-24-56-24 (W4M)	21 Oct 1980 (3 h)	577.0	Blowout Servicing (standing)	7 m^3 oil, 40 x 10^3 m^3 sweet gas	Casing valve left open overnight
TEXACO WIZARD LAKE B-2 5-22-48-27 (W4M)	28 Oct 1980 (1)	1 938.0	Blowout Servicing (tripping)	No estimate of sweet hydrocarbon loss	Lubricator removed before wireline pulled

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
HUSKY GCD NORTH KITSCOTY NO. 28	28 Nov 1980 (3 h)	577.0	Blowout Servicing	42 m³ oil, 14 m³ salt water	Well improperly killed prior to servicing
RENAISSANCE PETMT EDWAND 7-10-61-17 (W4M)	1 Dec 1980 (3)	648.0	Blowout Drilling	570 x 10³ m³ sweet gas, rig burned, 1 injury	Lost circulation, surface casing split

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
MESA CAROLINE 5-28-34-6 (W5M)	10 Jan 1979 (4)	1 975.0	Blowout Servicing (drilling)	480 m³ oil, 120 x 10³ m³ sweet gas	Poor cement job over Cardium
CDNOXY ET AL EAGLESHAM 9-9-77-25 (W5M)	18 Jan 1979 (1)	1 805.0	Blow Drilling (tripping)	No estimate of sweet hydrocarbon loss	Swabbing
COMPADRE SIBBALD 6-25-27-2 (W4M)	29 Jan 1979 (0.5)	904.0	Blow Drilling (tripping)	No estimate of sweet hydrocarbon loss	Swabbing, lost circulation
MOBIL WCT CARSON N 6-34-61-12 (W5M)	16 Feb 1979 (1.5)	2 623.0	Blowout Other (water inj)	No estimate of sweet hydrocarbon loss, casing valve	Equipment failure
SHELL RANDALL 12-10-81-2 (W5M)	26 Feb 1979 (1)	484.0	Blowout Drilling	No estimate of sweet hydrocarbon loss, fire damage to rig	Failure of bleed-off hose on blooey line while air drilling
AQUIT RAINBOW S 4-1-108-10 (W6M)	27 Feb 1979 (0.5)	1 902.0	Blowout Other (pump oil)	No estimate of hydrocarbon loss (4% H_2S), stuffing box, flow tee	Equipment failure
RUPERTS ET AL MITSUE 11-32-71-3 (W5M)	11 Apr 1979 (7)	1 660.0	Blow Drilling	1400 x 10³ m³ sweet gas	Lost circulation

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
IMPERIAL WOODBEND #74 8-8-51-26 (W4M)	17 Apr 1979 (15 min)	1 622.0	Blowout Servicing (pumping oil)	1.6 m^3 oil	Human error, incorrect procedure
BLUESKY PETROMARK KMG SUNNY N 7-5-25-9 (W4M)	4 May 1979 (3 h)	872.0	Blowout Other (capped gas)	0.7 x 10^3 m^3 sweet gas	Wellhead came off - improperly installed
TEXACO MCMURRAY STEAM PROJECT Sec 15-88-8 (W5M)	11 Jun 1979 (12)	136.0	Blowout Other (crude bitumen)	No estimate of sweet hydrocarbon loss	Equipment failure
AMOCO ET AL BEARBERRY 10-32-32-7 (W5M)	13 Jun 1979 (1)	2 894.0	Blowout Servicing (frac job)	113 x 10^3 m^3 sweet gas, 1 injury	Equipment failure
NORCEN ET AL WESTLOCK 11-23-59-27 (W4M)	21 Jun 1979 (0.5)	730.0	Blow Drilling (circulating)	No estimate of sweet hydrocarbon loss	Lost circulation
AMOCO GRANADA 3-29-52-11 (W5M)	27 Aug 1979 (1.5)	2 090.0	Blowout Servicing (frac job)	140-280 x 10^3 m^3 sweet gas, 1 injury	Equipment failure
HARRY W BASS ET AL EDSON 7-26-51-19 (W5M)	30 Aug 1979 (7)	3 088.0	Blowout Other (susp gas)	No estimate of hydrocarbon loss (2% H_2S)	Equipment failure (casing)

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
PCP NUMAC TANGENT 6-32-80-23 (W5M)	30 Sep 1979 (1)	1 118.0	Blow Drilling (tripping)	25 x 10^3 m^3 sweet gas	Failure to keep hole full
ESSO UNION MUSREAU 16-28-64-6 (W6M)	3 Oct 1979 (1)	2 653.0	Blow Drilling (cementing)	No estimate of sweet hydrocarbon loss	Insufficient cement column behind intermediate casing
PACIFIC EMPRESS 13-35-19-1 (W4M)	6 Oct 1979 (0.5)	617.0	Blow Drilling (tripping)	460 m^3 sweet gas	Failure to keep hole full
ZAPATA ET AL FORESTBURG 11-23-40-15 (W4M)	13 Oct 1979 (1)	961.0	Blow Other (susp gas)	No estimate of sweet hydrocarbon loss, gauge needle valve	Possible vandalism - equipment failure
MOBIL UNIT BHL CARON N 14-1-62-12 (W5M)	27 Oct 1979 (1)	2 647.0	Blow Drilling (tripping)	28 x 10^3 m^3 sweet gas	Failure to keep hole full, hole in surface casing at 36 m
KISSINGER ET AL MILLS 7-35-70-11 (W4M)	7 Nov 1979 (0.5)	515.0	Blow Drilling (fishing)	No estimate of sweet hydrocarbon loss	Swabbing with fishing tools
AMOCO ET AL STEEP 7-28-66-7 (W6M)	22 Nov 1979 (3)	2 338.0	Blowout Drilling (fishing)	280 x 10^3 m^3 sweet gas	Swabbing with fishing tools

4.4 Historical Summary

BLOW AND BLOWOUT OCCURRENCES - 1988 to 1979

Well Name	Date and Duration (days)	Depth (metres)	Occurrence Operation	Loss	Cause
BRASCAN ET AL RANFURLY 2-5-51-12 (W4M)	23 Nov 1979 (0.5)	600.0	Blowout Servicing (tripping)	No estimate of sweet hydrocarbon loss	Lost circulation
GLENORA ET AL GUNN 10-8-55-3 (W5M)	2 Dec 1979 (6 h)	1 304.0	Blow Other (shut in)	No estimate of sweet hydrocarbon loss	Insufficient cement column behind production casing
GLENIS ET AL SIBBALD 10-16-28-2 (W4M)	7 Dec 1979 (1)	774.0	Blow Drilling (cementing)	27 x 10^3 m^3 sweet gas	Lost circulation

APPENDIX - DEFINITIONS

The definitions of terms used in the Drilling Rig Inspections section in this report are:

Active Rig	A rig that drilled at least one well in 1987.
Blow	A flow of fluids (gas, oil, water, mud, etc) to the atmosphere from a well, which can be or is brought under control in a very short time-frame by closing appropriate equipment (control regained almost immediately).
Blowout	A complete loss of control of a flow of fluids from a well. Control can only be regained by the installing of equipment to shut in or kill the well, or by drilling a relief well.
Critical Sour Well	a) any well from which the maximum potential hydrogen sulphide (H_2S) release rate is 0.01 cubic metres per second (m^3/s) or greater and less than 0.1 m^3/s and which is located within 500 metres (m) of the corporate boundaries of an urban centre, or b) any well from which the maximum potential H_2S release rate is 0.1 m^3/s or greater and less than 0.3 m^3/s and which is located within 1.5 kilometres (km) of the corporate boundaries of an urban centre, or c) any well from which the maximum potential H_2S release rate is 0.3 m^3/s or greater and less than 2.0 m^3/s and which is located within 5 km of the corporate boundaries of an urban centre, or d) any well from which the maximum potential H_2S release rate is 2.0 m^3/s or greater, or e) any other well which the Board classifies as a critical sour well having regard to the maximum potential H_2S release rate, the population density, the environment, the sensitivity of the area where the well would be located, and the expected complexities during the drilling phase.

Kick	Any entry of water, gas, oil, or other formation fluid into the wellbore.
Lost Circulation	The loss of drilling fluids from the wellbore into permeable formations penetrated by the well.
Serious Deficiency	A serious deficiency is any violation of regulations which occurs when a formation is open to the wellbore and which occurs prior to, during, or after the installation of appropriate BOP equipment and which could - restrict the crew's ability to safely detect and circulate out a kick or shut in the well, - contribute to an operational failure of any BOP equipment, - impair the crew's ability to maintain control of the well.
Significant Deficiency	Deficiencies rated as significant are those which should not affect the operation of the BOP system or restrict the crew's ability to control the well.
Sour Gas	Natural gas, including solution gas containing H_2S.
Sour Well	Any oil or gas well expected to encounter sour gas-bearing formations during drilling or any oil or gas well capable of producing sour gas.
Spud	Means commenced drilling.
Water Flow	An influx of water into the wellbore from a formation penetrated while drilling that may present problems in maintaining hole integrity.

Operations at time of blow or blowout

- Drilling	Original operation to drill a well or subsequent deepening of a well.
- Servicing	Servicing operations at a well involving completion, stimulation, special testing, recompletion, or changing downhole equipment (often called workovers).
- Other	Routine production/injection and maintenance operations, third-party damage, suspended, or standing well.